

281

BOTANICAL ABSTRACTS

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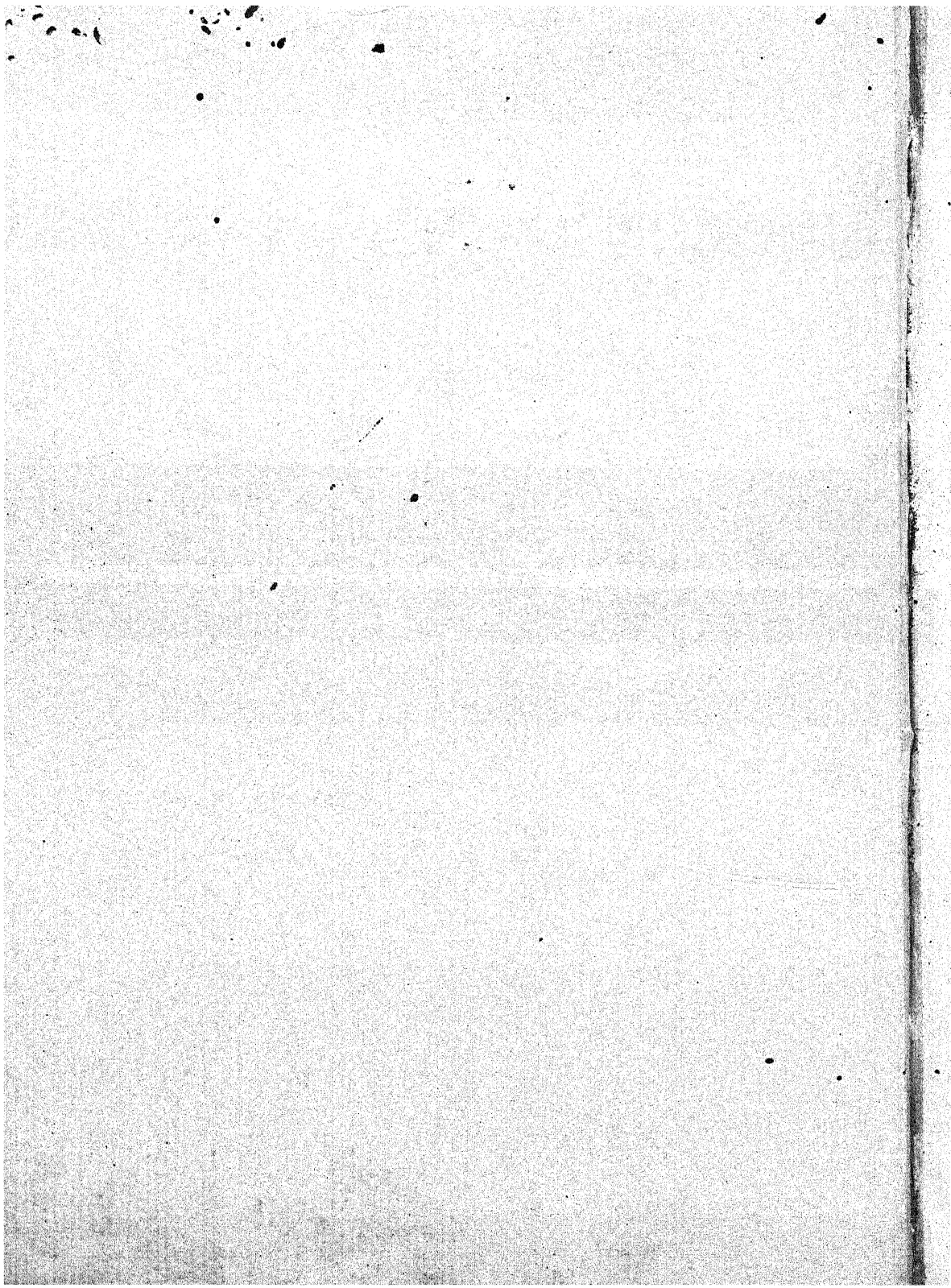
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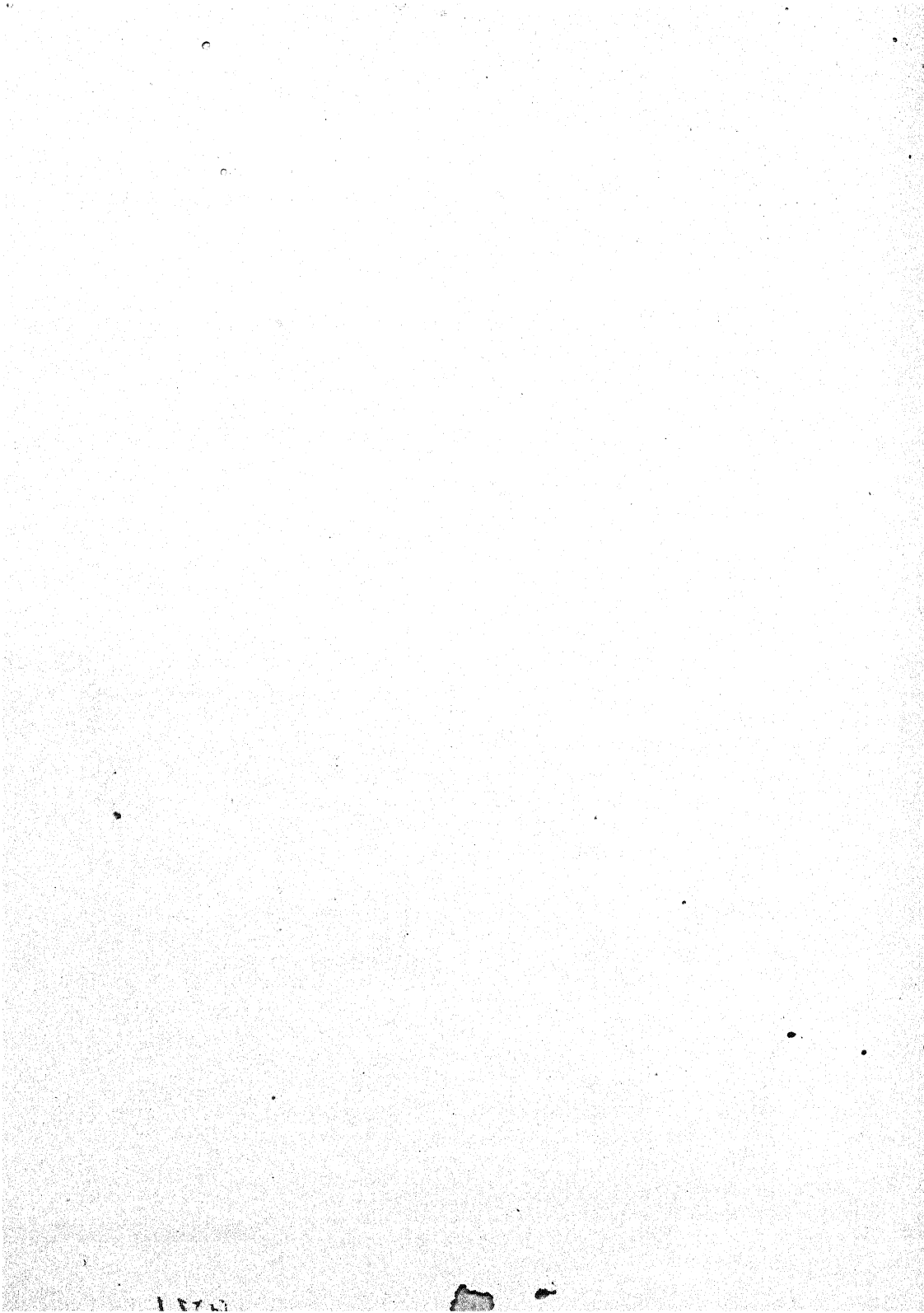


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BURTON E. LIVINGSTON, Editor-in Chief
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Vol. I

SEPTEMBER, 1918

No. 1

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1. Dahl, J. L., Hints for collecting botanical and zoological material. *School Sci. Math.* 18: 52-53. Ja., 1918.—Material should be obtained from neighborhood: dry fruits, seeds for testing viability, twigs, wood and bark, fleshy fruits, stages of development of apple fruit, and rare specimens in formalin.—GAGER.

2. Gager, C. Stuart, The near future of botany in America. Address of the vice-president and chairman of Section G, Amer. Assoc. Adv. Sci., Pittsburgh, December, 1917. *Science N. S.* 47: 1-14. 1. F., 1918.—Discusses the national need for botanical research on pure as well as applied science, especially in genetics, physiology, ecology, and pathology; also additional facilities for technical and popular botanical publication and promotion of study of botany in high schools and colleges; exploration, sanitation, agriculture and horticulture, food, fiber and drug supplies, forestry and conservation.—GAGER.

3. Lunell, J. The collecting, drying and mounting of specimens. *Amer. Midland Nat.* 5: 191-195. Ja., 1918.

4. Monsch, Genevieve, How school gardens tend to direct a natural course in botany. *School Sci. Math.* 18: 36-42, 124-129. Ja.-F., 1918.—This course grew out of garden work. No textbook used; seed catalogs and garden guides were in constant use. Foundation of course was work out of doors. First lesson was on annuals, biennials and perennials. Work continued for ten weeks. Morphology of flowers, first in many textbooks, was taken up last. Constant intelligent questions proved success of method.—GAGER.

5. Ragland, Fannie, A study of shade trees for Grades Seven and Eight. *Nat. Study Rev.* 14: 110-120. Mr., 1918.

6. Vinal, W. G., Some mechanical aids in nature study. *Nat. Study Rev.* 14, 60-73. F., 1918. Contains list of plants for various conditions; clear key to trees in winter.—GAGER.

7. Waggoner, H. D., The fundamental relation of botany to scientific agriculture. *School Sci. Math.* 18: 11-15. Ja., 1918.—A strong sentiment exists against the old type of botany. The science of alfalfa and corn is just as good as that of the orchid and alga. Botany should be more closely correlated with agriculture. The teacher of botany should have sympathy for and knowledge of present day agriculture.—GAGER.

ECOLOGY

H. C. COWLES, *Editor*

8. Gravatt, C. F., and G. B. Posey. Gipsy-moth larvae as agents in the dissemination of the white-pine blister-rust. Jour. Agric. Research 12: 459-462. 1918.—The larvae of the gipsy moth hatch and are scattered by wind during the period of spore production of the white pine blister rust. The larvae feed abundantly on the spores, and their bodies in such cases are covered with numerous spores. Gipsy moth larvae feed freely on leaves of *Ribes*, and since it has been shown that these larvae may be blown as far as twenty miles, the authors conclude that they may be important carriers of infection.—H. C. COWLES.

9. Harper, Roland M., The plant population of northern lower Michigan and its environment. Bull. Torr. Bot. Club 45: 23-42. 3 fig. 1918.—From observations made in the vicinity of the Biological Station of the University of Michigan, at Douglas Lake, and from notes taken from car windows, has been compiled a somewhat quantitative estimate of the plant population of the northern part of the lower peninsula of Michigan. The geology, topography and climate as well as the vegetation are briefly described and a bibliography of much of the earlier literature relating to the plant life of this region is given.—GEO. D. FULLER.

10. Roper, Ida M., *Spartina* and coast erosion. Kew Bull. Miscellaneous Information (No. 1) 1918: 26-31. 1 map. 1918.—Attention is called to the effectiveness of *Spartina Townsendi* in establishing itself in the soft mud of tidal flats, and to the extent that shore erosion is checked when such flats are thickly carpeted with this grass. Four years ago plantings of *Spartina* were made between the estuaries of the rivers Kenn and Yeo in North Somerset, England, where the severe tidal currents of the Severn have been very destructive. Already the plants have spread extensively and they bid fair to carpet the ground somewhat thoroughly.—H. C. COWLES.

11. Waller, A. E., Crop centers of the United States. Jour. Amer. Soc. Agron. 10: 49-83. 12 figs. 1918.—“The crop centers of the United States agree with the biotic centers.” For example, “the corn and winter wheat belts correspond to the deciduous central forest and the prairie climaxes, the tame hay and pasture region to the northeastern evergreen forest,” and “the cotton belt to the southeastern evergreen forest. The rainfall-evaporation ratio map is useful for the demarcation of these centers, because in it are included four factors of climate, namely, relative humidity, temperature of the evaporating surface, and wind velocity as the divisor, and precipitation as the dividend.—“A fundamental difference between crop plants and the natural vegetation is seen when plants are found beyond their usual centers. The crops are found on the best soils only, since that is their sole chance to compete with other crops for profit. Plant invaders of the indigenous vegetation migrating from their centers can offer competition in the poorest habitats only. In the better habitats the plants belonging to the center are little influenced by invaders. In the extreme cases, climatic as well as soil modifications are practiced. Field plants are then grown on a comparatively large scale under glass or cloth shelter. The domesticated animals are grouped about the centers of production of those crops upon which they are most dependent. The methods used in studying plant succession have been used here. It is in this field of research that an accurate interpretation of conditions as consequences of the operation of physical forces of the past and present has been made. Migration, including invasion and competition, the latter implying dominance, are the direct results of interaction of climate and soils upon vegetation.”—H. C. COWLES.

12. Watson, Russell, Relation of stimuli to the cone production of western hemlock. Jour. Forestry 16: 168-175. 1918.—If the vegetative activities of thrifty western hemlock trees are suddenly checked by injuries, the tree usually is stimulated to reproductive activity. Factors which commonly stimulate the tree thus are injuries by fire and insects, mechanical abrasions, wind-throwing, decapitation, and girdling.”—H. C. COWLES.

13. Weir, Jas. R., Notes on the altitudinal range of forest fungi. Mycologia 10: 4-14. 1918.—Investigations of the occurrence of forest fungi in the higher mountains of Washington,

Oregon, Idaho and Montana leads to conclusion that, while a few species are strictly alpine in habitat, the majority of forest tree fungi have a wide altitudinal range being most abundant in the lower forested areas and decreasing very greatly as the upper limits of the timbered zones are reached. Temperature and variations in moisture conditions may greatly influence the form and color of the aerial parts of fungi occurring at higher altitudes, without changing their development within the substratum or affecting the vitality of the spores. Structural features of alpine woody plants, such as cutinization, thicker epidermis and denser wood, offer greater resistance to infection. A table is given of the highest known occurrence of each of over 80 species of forest tree fungi together with host and locality where the observation was made.—GEO. D. FULLER.

GENETICS

GEO. H. SHULL, *Editor*

14. Bregger, T., Linkage in maize: The *C* aleurone factor and waxy endosperm. *Amer. Nat.* 52: 57-61, Jan., 1918.—Reference is made to investigations of Collins (*Amer. Nat.* 46: 569-590, 1912) demonstrating linkage between waxy endosperm and aleurone color of maize. Author's data, derived from F_1 plants heterozygous for waxy endosperm and a single aleurone color factor, back-crossed to double recessives, showed average percentage of crossing over of 26.7. A single back cross of an unrelated F_1 indicated independent inheritance, cross-over percentage 49.3. Colorless-seeded plants from pedigrees showing linkage gave colored seeds when crossed with colorless aleurone testers *a C R* and *A C r* and colorless seeds when crossed with tester *A c R*, thus indicating that *C c* is aleurone-factor pair concerned in linkage with waxy endosperm. Similar tests of plants of non-linkage cultures showed that neither *C c* nor *R r* was concerned.—R. A. EMERSON.

15. Cockerell, T. D. A., A new hybrid sunflower. *Torrey* 18: 11-14, Jan., 1918.— F_1 generation of cross of *Helianthus annuus* \times *petiolaris* is described. Special interest in this cross lies in fact that certain other forms, namely, *H. aridus* and *H. petiolaris* var. *patens* have been suspected of being hybrids of above-named parents. Published descriptions, however, are so different from that of present hybrid that author is led to observe that "this hybrid is obviously not *aridus* or *patens*." Article includes brief historical discussion of several species of sunflower.—L. H. SMITH.

16. Collins, G. N., Tropical varieties of maize. *Jour. Heredity* 9: 147-154. Ap., 1918.—Several types of maize possessing adaptive characteristics are noted and illustrated. Among these characters are single, long primary root, and mesocotyl capable of unusual elongation, of Hopi maize, adapting it to deep planting practiced by Indians of plains of Arizona and New Mexico; hairiness, surface rooting habit, and ability to grow at relatively low temperatures, of *Zea hirta*, adaptations to cool climate and light summer showers of high tablelands of Mexico; ability to withstand high temperatures, of another Mexican type; waxy endosperm and ability to withstand hot winds at flowering time, of a Chinese maize; the characteristic of remaining green long after maturity, of a Bolivian type; and the well protected ears of a maize from Guatemala. Suggests that, while none of these types is suited to wide commercial culture, they possess characteristics that might well be combined with valuable characteristics of common commercial varieties. As illustration of practicability of thus combining characters of diverse types, author cites cross of sweet corn, having poorly protected ears and therefore seriously injured by ear worms, with southern field corn, having ears well protected by long, thick husks, which resulted in production of sweet corn of good quality with well protected ears. Urges that survey of maize types be made and exchange of varieties between maize producing countries be effected.—R. A. EMERSON.

17. Collins, G. N., New-place effect in maize. *Jour. Agr. Res.* 12: 231-243. F., 1918.—Comparison of yields of locally grown and introduced pure-bred and hybrid seed of *Zea mays*. Controlled experiments, made with strains known to be identical, in Maryland, Kansas, Texas and Arizona, indicate that seed grown in another locality gives higher yields. Author con-

siders results due to physiological new-place effect. Since new-place effect in maize acts as stimulus it would tend to obscure any lack of adaptation in newly introduced varieties. Thus existence of new-place effect increases rather than decreases importance to be attached to local adaptation. While new-place effect must be considered as factor in production, this should not be used as argument in favor of general transfer of seed. No evidence that importance of using acclimatized seed has been over-estimated.—J. A. HARRIS.

18. Cook, J. Glenn, Unusual variation in crook-neck squash. Jour. Heredity 9: 24. Ja., 1918.—Figure illustrating diverse types of squash derived from "crook-neck" grown previous season in bed containing "scallop" and "crook-neck" squashes, with brief note of explanation. The forms varied from typical "crook-necks" to intermediate types between "scallops" and "crook-necks;" warts, typical of "crook-necks," were present on some specimens and absent on others; and color varied from white and light gray to yellow and orange.—RICHARD WELLINGTON.

19. De Vries, Hugo, Mutations of *Oenothera suaveolens* Desf. Genetics 3: 1-26, Ja., 1918.—*Oenothera suaveolens*, related to *Oe. grandiflora*, produced in pure culture, mutants: (a) *apetala*, "half race" having some flowers apetalous and considerable proportion with less than typical four petals; (b) *jaculatrix*, very narrow foliage; (c) *fastigiata* narrow leaves and erect branches; (d) *lata* with 15 chromosomes; (e) *sulfurea*, pale yellow flowers; (f) *lutescens*, pale foliage. *Fastigiata*, *jaculatrix* and *lata* are figured. *Fastigiata*, *jaculatrix*, *lutescens* and *sulfurea* bred true when selfed; *lata* selfed, or crossed with pollen of *suaveolens*, produced about 50 per cent *suaveolens*, 25 per cent each of *lata* and *lutescens*. Breeding capacity of *apetala* not yet tested. *Suaveolens* crosses with *sulfurea*, reciprocally, produced patroclinous F_1 , and with *lutescens*, matroclinous F_1 . Reciprocal crosses of *Oe. suaveolens* with *biennis* L., "*biennis* Chicago," and *syrticola*, and double reciprocals of *suaveolens* and *biennis* produced in each case uniform progeny, except that some *lutescens* appeared in *suaveolens* \times *biennis*. *Suaveolens* with "*biennis* Chicago" gave hybrids intermediate but goneclonic to latter species. In all other crosses reciprocal families distinctly unlike, mostly intermediate. Crossed with *Lamarckiana*, *suaveolens* produced intermediate hybrids plus about one-fourth *lutescens*. When *Lamarckiana* was pollen parent, green offspring were of twin types, *laeta* and *velutina*, but in reciprocal cross were uniform. No *lutescens* appeared in *Lamarckiana* mut. *lata* \times *suaveolens*. Author attributes occurrence of large percentage of *lutescens* to mass mutations.—G. H. SHULL.

20. De Vries, Hugo, Mass mutation in *Zea mays*. Science, n.s. 47: 465-467. 10 My., 1918.—Author cites a case of mutation in maize, known as *Zea mays sterilis*, considered similar to mass mutation noted by Bartlett in *Oenothera Reynoldsii* and *Oe. pratincola*. Sterile plants devoid of branches, ears, ramifications of spike, and male flowers, appeared first in seventh generation of highly self-fertilized cultures, constituting 12 per cent of culture. Intermediate forms with incompletely developed ears and spikes also seen. One of latter yielded 19 per cent of sterile plants in eighth generation. Suggests sexual cells of fifth generation mutated to unbranched type and combined with normal gamete to produce intermediate, half mutant, in sixth generation, producing 12 per cent sterile mutants in seventh generation. Mass mutation considered important principle but known instances mostly retrogressive mutations. Reference made to apparent mass mutation in *Ranunculus arvensis*, *Linaria vulgaris*, *Papaver Rhæas*, *Scrophularianodosa*, *Clarkia pulchella*.—R. A. EMERSON.

21. Dexter, John S., Inheritance in Orthoptera. Amer. Nat. 52: 61-64. Ja., 1918.—Brief review and criticism of work of Nabours on Parattetix. Nabours recognizes some fourteen color patterns as allelomorphic to each other and one "allelomorphic only to its absence." One of the fourteen while generally allelomorphic to the others is not always so. Author points out that Nabours's evidence indicates that the fourteen characters are determined by genes in one chromosome and that at least one of these is incompletely linked with the others. Character that is "allelomorphic to its absence" is simply first known character of another linkage group belonging to another chromosome. Cites similar situation in *Drosophila* few years ago, as illustration.—N. R. STOLL.

22. Fernald M. L., American variations of *Epilobium* section *Chamaenerion*. *Rhodora* 20: 1-10. Ja., 1918.—Fernald recognizes following variants of *Epilobium* (*Chamaenerion*) *angustifolium*: (1) forma *albiflorum*, petals and sepals white; (2) forma *spectabile*, petals white, sepals red, (3) var. *macrophyllum*, leaves much broader than in type, secondary veins prominent, inflorescence leafy-bracted, lower bracts broad; (4) var. *intermedium*, plants low, leaves and inflorescence much shorter than in type; (5) var. *platyphyllum*, leaves bluntish or merely acutish. Data is given indicating definite geographical ranges for these variants. Second part of paper is largely discussion of Forsaith's and Jeffrey's claims that *Epilobium angustifolium* within range of its ally *E. latifolium* crosses with it producing hybrids distinguished from *angustifolium* by presence of much defective pollen. Fernald contrasts those characters of the two species which might be expected to be represented in hybrids, either modified or in recombinations, and which have not been described by Forsaith for the assumed hybrids. Forsaith's citations and map of distribution are sharply criticized as inaccurate and it is pointed out that supposed hybrids were frequently from stations from 100 to 1000 miles away from nearest colony of one of assumed parents.—BRADLEY M. DAVIS.

23. Goldschmidt, Richard, A preliminary report on some genetic experiments concerning evolution. *Amer. Nat.* 52: 28-50. Ja., 1918.—Author concludes that multiple allelomorphs are different quantities of an active substance, perhaps enzyme. Conception is based in part upon experiments with gypsy moth, of which there are number of geographical races. Referring only to larval pattern, races differ in amount of pigmentation which encroaches upon light pattern common to all. In general, F_1 intermediate between races crossed, F_2 gives 3 light + medium to 1 dark, and back crosses a ratio of 1 to 1. Pigment factors in all races are allelomorphic to each other.

Races of gypsy moth also differ in pigmentation of successive instars of larva. Some are light in all stages, others develop varying degrees of deeper pigmentation in later stages. F_1 between constant light race and constant darker race is intermediate or lighter at first, but becomes dark later. These races likewise differ in rate of differentiation and number of moults, and degree of pigmentation is function of time of development. By prolonging larval stage through starvation, depth of pigment characteristic of fourth instar may sometimes be attained in third instar. When mosaic larvae, having two sides of body unequally pigmented, appear in shifting race, deepening of pigment in successive stages is about equally rapid on the two sides. Such larvae produce normal moths, and their offspring are normal.

These facts show multiple allelomorphs to be different quantities of active substance, producing effects in proportion to their quantity. Former work indicated that sex in this moth is in like manner dependent upon quantitative differences in sex factors, nearly balanced quantities resulting in intersexes.

Quantitative somatic factors owe their variations either to the medium, or to fluctuation of genes. If to latter selection of extremes is effective. Castle's selection experiments with hooded rats held to be in accord with results from gypsy moth. Geographical races, beginnings of species, owe origin to these quantitative differences in genes. Natural selection may aid in their establishment, even when visible character has no selection value. Thus, in *Lymantria monacha*, dark forms have replaced white ones, not because of pigment, but because they are stronger and better fliers. Replacement has occurred in recent decades probably because of industrial development, deforestation, and war on insect pests, against which weaker white forms could not maintain themselves. Races of gypsy moth are believed to be adapted to different climates, not because of pigment, but because of differences in relative duration of larval and pupal stages. Evolutionary conclusions unsafe, however, without genetic tests, for two somatic characters apparently precisely alike may be physiologically quite unlike. Thus, *Callimorpha dominula* exhibits in Germany yellow sport like yellow Italian race. Chemically these yellows may be identical, but moths behave very differently in crosses.

Quantitative theory of genes held to obviate difficulties attending explanation of temperature-aberrations in Lepidoptera, mimicry, and improvement of breeds under domestication.—A. F. SHULL.

24. Gortner, R. A., The anthocyanin pigments of plants. Science n. s. 47: 418-419. 26 Apr., 1918.—Review of book of same title by Muriel Wheldale. (Cambridge University Press, Cambridge, England, 1916.) Second part of book relates to "Anthocyan and genetics." Reviewer finds work thoroughly done, and author "extremely conservative" about formulating hypotheses, and making no attempt "to further any pet hypothesis."—G. H. SHULL.

25. Halsted, Byron D., Colors in vegetable fruits. Jour. Heredity 9: 18-23. Ja., 1918.—In tomatoes skin is either transparent or contains orange pigment, while flesh is either lemon yellow or pink-purple. Four possible combinations of two kinds of skin and two colors of flesh give rise to four colors of fruit: lemon, orange, pink and red. Color of skin and of flesh behave in simple Mendelian manner, orange skin being dominant to colorless, and pink-purple flesh to lemon-yellow. Some modifications of skin color are due to environmental factors, to thickness and smoothness of skin, and to hairiness.

In eggplants intensity of purple color varies in fruits of different varieties. Two classes of purple differ with respect to influence of sun, one developing without exposure to sun (as under the calyx), and other requiring exposure. In contrast to purple varieties, are white and green varieties having colorless skin. Difference between white and green varieties is due to color of flesh. Purple skin is dominant to colorless, and green flesh to white. Striped variety gave fruits slightly striped in F_1 from crosses with white varieties, and with purple-fruited varieties gave purple fruits in F_1 . Variety "Long White" crossed with dwarf purple gave purple fruits in F_1 and purple, pink, green and white fruits in F_2 .

In peppers skin is always colorless, while flesh is usually either red or orange. Orange is recessive to red. In variations of color which appear as fruit ripens, light green is recessive to dark green and changes to yellow, and various other colors are recessive to simple change from green to red.—C. F. NOLL.

26. Halsted, Byron D., Reciprocal breeding in tomatoes. Jour. Heredity 9: 169-173. Ap., 1918.—Discussion of characters of 120 plants of second generation from reciprocal crosses between varieties Dandy Dwarf (drawf plants with yellow foliage, coarse leaves, and red fruits) and Yellow Cherry (standard plants with green foliage, fine leaves, and yellow fruits). In number of instances, characters of respective crosses considered separately, differ widely from theoretical Mendelian ratio but totals from both crosses closely approach it. Besides four character pairs noted above, data are presented on relation of type of plant to weight, length and width of fruit; relation of color of foliage to weight, length and width of fruit; relation of type of foliage to weight, length and width of fruit; relation of color of fruit to weight, length and width of fruit. Author concludes that, for Mendelian characteristics, seed parent in both combinations shows more potent influence over offspring than does pollen parent. But with characters of fruit, weight and size, requiring averages for expression of results, evidence points to greater influence of pollen parent.—C. E. MYERS.

27. Hansen, Albert A., Petalization in the Japanese quince. Jour. Heredity 9: 15-17. Ja., 1918.—Illustrates intergradations of stamens and petals in *Cydonia japonica*.—J. A. HARRIS.

28. Harris, J. Arthur, The interrelationship of the number of stamens and pistils in the flower of *Ficaria*. Biol. Bull. 34: 7-17. Ja., 1918.—Statistical treatment of data published by Ludwig, Lee, McLeod, Weldon, and Pearson. Coefficient of variation for pistils is larger than for stamens. Tables of correlation between number of stamens and pistils, regression equations, and diagrams are given. Author concludes that, as total number of sporophylls increases, pistils are relatively more numerous than stamens. He deduces this by means of a formula, developed in an earlier paper, giving correlation between total number of sporophylls in a flower and deviation of number of pistils and stamens from their probable number. According to his results these correlations are of equal magnitude, but opposite in sign and negative for stamens.—HELENE M. BOAS.

29. Harris, J. Arthur, and B. T. Avery, Correlations of morphological variations in the seedling of *Phaseolus vulgaris*. Bull. Torrey Bot. Club 45: 109-119. Mr., 1918.—Many thou-

sands of individual seedling bean plants were examined with reference to certain morphological abnormalities connected with development of first three nodes. These observations had to do with placement of cotyledons, number of cotyledons, number of primordial leaves, fasciation-like structure of internode above primordial leaves, division of axis in this same internode, number of leaves at third node, number of leaflets in third node leaves, and lobing in third node leaves. Frequencies of these abnormalities are tabulated in such manner as to show their correlations with one another. It appears that abnormalities connected with upper node and upper internode tend to increase according to amount of abnormality displayed at earlier stages of development of seedling.—L. H. SMITH.

30. Harris, J. Arthur, and A. F. Blakeslee, in cooperation with Wm. F. Kirkpatrick, The correlation between egg production during various periods of the year in the domestic fowl. *Genetics* 3: 27-72. Ja., 1918.— Analysis of data from annual egg-laying contests of White Leghorn fowl at the Connecticut Agricultural Experiment Station, 1913-14, and 1914-15. Correlations of monthly egg records with total number of eggs laid during the year, and with number laid during the remaining eleven months for purpose of determining selection value of records for each single month. Correlations of monthly with annual egg production range from 0.37 and 0.38 in November and April to 1.49 in February and 0.69 in September. Correlation of each month with the total for the remaining 11 months is less, but positive and statistically significant for every month, ranging from 0.24 to 0.57. Regression lines are nearly linear and in close agreement for the two years. Separation of flock on basis of egg-laying performance and elimination of poor layers in early months result in material increase in average annual egg production.

Correlations between individual months tend to become smaller as interval between them becomes greater, but antagonistic to this principle is fact that correlation between autumn and winter months at beginning and at end of year tends to be greater than correlation of these months with intervening spring and summer months.

Influence of monthly egg production upon total annual egg production differs greatly in the several months, being greater in autumn and winter months than in spring and summer months.—G. H. SHULL.

31. Hawkes, Mrs. Onera A. Merritt, Studies in inheritance in the hybrid *Philosamia* (*Attacus*) *ricini* (Boisd.) ♂ *Philosamia* *cynthia* (Drury) ♀. *Jour. Genetics* 7: 135-154. F., 1918.—Larva of *P. cynthia* has seven complete longitudinal series of black spots, while five of these are entirely lacking in *P. ricini*, and remaining two are generally partially present, though variable. For sake of convenience, author calls former condition "spotted" (*S*), latter "plain" (*P*). All of 149 *F*₁ larvae resulting from this cross had spots on upper part of body; most had full complement of spots characteristic of *cynthia* and were therefore spotted (*S*), but some had only portion of these spots and were called "reduced spots" (*RS*). This state of affairs is referred to in summary as "incomplete dominance" in spite of fact that dominant homozygous and heterozygous forms could be distinguished only by breeding, both being either fully or partially spotted.

Twelve matings of moths of *F*₁ generation, produced *F*₂ families which consisted of *S*, *RS* and *P* types of larvae in proportions 3 (*R* + *RS*) to 1 *P*. Every variety of mating was made to test whether *S* and *RS* have different hereditary values, but gave no indication of any difference. In *F*₃, however, one family appeared, consisting entirely of *S* larvae. Author expresses belief that full spots are due to series of unit characters, linked to one another rather more closely than to other characters. No further support is given for this hypothesis. No families produced only *RS* forms. On other hand, 20 matings of plain to plain produced only plain larvae. *P* form is consequently regarded as simple recessive.

Another character dealt with was presence of abnormal tubercles on bodies of certain caterpillars in *F*₂. There were 47 abnormal individuals in about 900 *F*₂ larvae. Tubercles (normally long) were either entirely absent, very short or varying in length on various segments of body. Author was unable to mate two moths arising from these abnormal caterpillars, but normal was mated with abnormal. All offspring were normal, but in next generation (*F*₂ of this cross) "larvae occurred with long, with short, and with no tubercles,—an

obvious Mendelian segregation." Owing to unfavorable conditions, author was not able to determine adequately genetic behavior of this character.—F. B. SUMNER.

32. Horsfeld, F. H., Longevity in lily pollen. Jour. Heredity 9: 90. F., 1918.—Pollen of early-blooming lilies, saved in envelopes, mostly effective after two or three months. Pollen of late-blooming *L. auratum*, wrapped in paraffin paper and kept in warm, dry place over winter, proved viable following spring on *Lilium martagon*, but later on other lilies gave no results. Author believes pollen potent only when first exposed to air and that if original lot from *L. auratum* had been preserved in separate envelope, and contents of each used as soon as opened, he would have been more successful.—J. P. KELLY.

33. Hunt, Harrison R., and Sewall Wright, Pigmentation in guinea-pig hair. Jour. Heredity 9: 178-181. Ap., 1918.—Attempt to correlate inheritance of coat color with form and distribution of diffuse and granular pigment in hair structure. Black and sepia hair contain black granules in cortex and medulla, usually more dense near tips. Red hair has yellowish granules in medulla, but few granules in cortex, which shows diffuse yellow. Yellow hair is dilute red, due to fewer granules and less diffuse pigment, but contains also some small black granules. Cream hair has very few granules, apparently black, but sections show no diffuse yellow pigment although authors suppose it probably present. Authors conclude that constitution of cortex imposes some obstacle to production of red pigment granules, but enzyme for black overcomes this obstacle. Dilution factors likewise reduce black pigment but little, while red considerably. "Thus it seems plausible that there is some characteristic peculiarity of cortex of guinea-pig hair which diminished quantity of cortical granular pigment in much the same way as dilution factors reduce total granular pigment contents."—J. A. DETLEFSEN.

34. Jeffrey, E. C., Evolution by hybridization. Jour. Heredity 9: 25-28. Ja., 1918.—Review of "Evolution by means of hybridization," by J. P. Lotsy (The Hague, Martinus Nijhoff, 1916). Lotsy explains hereditary variations as result of hybridization. Defines species as group of like individuals breeding true from seed, genetically pure when back-crossed. Shows species may be derived from self-fertilized or freely crossing heterozygotes which makes for apparent uniformity of progeny. Holds all groups in period of greatest luxuriance are heterozygous, and surviving forms are degenerate homozygous species. Equiseta are example. Reviewer believes facts of morphology and phylogeny show reverse of Lotsy's conclusion to be true for Equiseta and other cryptogams. Holds that many groups of Angiosperms are plexus of hybrids rather than pure species. Therefore cannot depend upon experimental results alone, but must consider facts of morphology and phylogeny if we would arrive at truth.—WILBER BROTHERTON, JR.

35. Kearney, T. H., A plant industry based upon mutation. Jour. Heredity 9: 51-61. F., 1918.—In 1899 U. S. Dept. Agric. introduced into this country principal varieties of Egyptian cotton, a superior long staple cotton which originated obscurely (doubtless by hybridization) in Egypt about 75 years ago. All varieties introduced were variable, field conditions in Egypt having favored unlimited cross-pollination, and were so unfruitful and late in ripening that selection was begun at Yuma, Arizona, in 1903, in "Mit Afifi," the variety then most extensively grown in Egypt. Gradual improvement resulted for several years. In 1908 sudden change occurred: two progeny rows differed strikingly from parents and from each other, giving rise to varieties "Yuma" and "Somerton," the first of which became basis of Egyptian cotton industry in Arizona; begun in 1912, 30,000 acres in 1917, and probably 100,000 acres in 1918. Variety "Pima," arising later from "Yuma," though commercially grown, has, by line breeding and coöperation of farmers in isolation of seed increase fields, been kept uniform while "Yuma," because of free crossing, is variable. Indications of mutational origin of varieties developed in Arizona are: each derived from single plant which appeared suddenly; and in several characters differed conspicuously from parent stock; intermediate forms not observed; progenies remained uniform so long as cross-pollination with other forms was prevented. Origin by mutation seems fairly well established in numerous varieties arising in Egypt, though records are less complete. Though mutation in Egyptian cotton has been observed only in heterozygous stocks ("Pima," line-bred, has produced none) such extreme mutants as "Yuma" and "Pima" can scarcely be explained on recombination hypothesis; the

mutant characters are not found in any stock with which parents might have been crossed, and intermediates between parent type and mutant are absent or extremely rare.—FRIEDA COBB.

36. Lippincott, William A., The case of the blue Andalusian. *Amer. Nat.* 52:95-115. F.-Mr., 1918.—Author reviews data relative to blue Andalusian fowls. When mate *inter se* these produce blacks, blues and splashed individuals in ratio 1:2:1. Black and splashed mated together always produce blues. Bateson and Punnett's explanation, that blues are expression of heterozygous condition of single pair of allelomorphs, usually accepted. Goldschmidt has suggested interaction of two pairs of allelomorphic factors: (*Q*) (a quantitative pigment factor) and *M* (a mosaic factor), to account for monohybrid ratio, complete linkage assumed, so that nothing is gained over assumption of single pair of factors.

Author has studied distribution of pigment granules in feathers of the three kinds of birds. In blacks, pigment is in form of rods, which almost completely fill cell. Pigment particles are found in all parts of feather barbs including the hooklets. In blues predominating shape of pigment granules is round. Only very rarely elliptical or rod-shaped granules occur. Further, in typical blues pigment is not found in extremities of either curved or hooked barbs. Hooklets also entirely devoid of pigment. Pigmented feathers from splashed individuals show exactly same pigment arrangement and granule shape as in blues.

On this basis, author proposes another bifactorial hypothesis, factors being *R* which restricts size of pigment granule and determines its arrangement within cell, and *E* responsible for extension of pigment to all feathers of body. Genetic constitution of black is *Er Er*, blue-splashed, *eR eR*, blue *Er eR*.

To account for results so far described for these matings, necessary to assume complete linkage, but author points out that if crossing-over should occur occasionally and crossover gametes *ER* and *er* were produced in equal number matings with ordinary blues would still give 1:2:1 ratio. Individuals arising from these crossover gametes could be detected only by careful genetic analysis. In the rather meager data so far published such individuals might well escape attention. Author points out kinds of matings necessary to discover any of crossover types if they occur.

A small amount of data is given relative to crosses between blue Andalusians and White Wyandottes. F_1 offspring here all blue owing to presence of extension factor *E*. Promises further data from matings now in progress.—F. M. SURFACE.

37. Love, H. H., and W. T. Craig, Small grain investigations. *Jour. Heredity* 9: 67-76. F., 1918.—Largely exposition of plant breeding work in small grains at Cornell University. Considerable increase in yield was obtained (shown by three-year average) by isolating pure lines from commercial varieties. Not possible to change type of oats in few years by selecting parent plants within pure line. Variation and correlation studies with oats and wheat were made, first, to determine amount and nature of variation and correlation and, second, to study effect of environment on their constants. Conclusions are: (1) conditions which result in reduced yield also result in reduced height, number of kernels, and number of culms, but in increased size of kernels; (2) low yield is produced by decrease in number of kernels rather than by decrease in their size; (3) variability decreases with decrease in means; and (4) correlations are more or less responsive to environmental conditions. In crosses between "Sixty Day" oat and *Avena fatua*, yellow color of former exhibited production of well developed awns and pubescence on glumes. One type of *fatua*, when crossed with "White Tartar King," gave 15 pubescent to 1 non-pubescent plant in F_2 while another type gave 3 to 1 ratio in F_2 . Two forms of black oats classed as same variety, gave white glumes in F_2 in ratio 15 black to 1 non-black. Naked oats crossed with hulled showed that nakedness behaved as simple monohybrid but the intermediates gave all gradations of naked condition. Fully awned was recessive to weak-awned and presence of ligule was represented by one and two factors in different sorts. Authors found evidence of linkage in oats. Red color of wheat kernels is represented in different sorts by one, two or more factors. Two successful wheat-rye crosses were made. Illustrations give idea of field technique as practiced at Cornell University, also appearance of several F_1 crosses and their parents.—R. J. GABER.

38. Metz, Charles W., The linkage of eight sex-linked characters in *Drosophila virilis*. Genetics 3: 107-134. Mr., 1918.—Describes following eight mutant characters and their linkage relations: yellow (body color), frayed (bands on abdomen), vesiculated (wings), magenta (eye color), hairy (eye surface), forked (bristles), glazed (eye surface), rugose (eye surface). Six of these are figured. Linkage relations indicate that these factors form linear series in order of succession above indicated, except that frayed may possibly be to left of yellow and glazed and rugose may be allelomorphous to each other. This series is in all essentials like sex-linked series of *D. ampelophila*. Single, double and triple crossing over occur. Cross-over values vary slightly in the several experiments, but agree generally as to order of succession. No mutant factors are found in Y chromosome and no crossing over between X and Y. Yellow and forked resemble characters of same name in *D. ampelophila*, and linkage relations of these characters are approximately same in both species. There are 82 units between known extremes of sex-linked series in *D. virilis* as compared with 62.6 units in *D. ampelophila*, indicating either greater length of sex-chromosome in former species, or greater frequency of crossing over per unit of actual chromosome length. Author believes latter to be true.—G. H. SHULL.

39. Morgan, T. H., Inheritance of number of feathers of the fantail pigeon. Amer. Nat. 52: 5-27. Ja., 1918.—Fantail pigeons, having from 28 to 38 tail feathers, crossed to ordinary race, having 12 tail feathers. Forty-one F_1 birds ranged from 12 to 20, with modal number 14. F_2 (278 birds) ranged from 12 to 26, with mode at 14 to 15; much larger proportion of them were 12-feathered than in F_1 . F_1 backcrossed to fantail gave 23 birds, ranging from 14 to 31. Three pairs of genes are enough to account for results. Data are presented indicating that one or more of genes for number of tail feathers is linked to gene for presence of oil gland, and to gene influencing color of tail feathers. Double feathers were observed, and study of them indicates that they probably arose from single rudiments that became split, rather than from separate ones that became fused. Castration of male pigeon produced no apparent effect on his plumage.—A. H. STURTEVANT.

40. [Popenoe, Paul], Meaning of genetic terms. Jour. Heredity 9: 91-94. F., 1918.—Glossary of some sixty terms used in modern genetical and eugenical literature.—J. L. COLLINS.

41. [Popenoe, Paul], Budding incompatible cottons. Jour. Heredity 9: 181. Ap., 1918.—Many attempts to secure fertile crosses between American upland cotton, *Gossypium hirsutum*, and two Asiatic species, *G. herbaceum* and *G. indicum*, have all been unsuccessful. In many instances hybrid bolls appear to set and later drop as if due to some chemical incompatibility in development. To overcome this, Mr. Meade grafted the two varieties reciprocally, thus hoping that stock would exert such chemical influence on cion that development of hybrid boll would be carried to completeness. Cions flowered so late, however, that no flowers were open on stock plants. That cotton stock may chemically influence cion is shown by results of budding dark-green-leaved cotton on stock having dark red foliage and stems. Branch growing from bud cion developed some red color typical of stock. This change in color was more noticeable on first leaves of cion and less as branch grew older.—J. L. COLLINS.

42. Robbins, Rainard B., Applications of mathematics to breeding problems. II. Genetics 3: 73-92. Ja., 1918.—Derives formulae for determining numerical relations of alternative types of offspring from monohybrid unit-character crosses after any number of generations under given methods of breeding. Part I gives formulae for sex-linked character, under random mating, assortative mating, brother and sister mating, and parent by offspring mating. Part II deals with independent (Mendelian) character when half of offspring are bred to one parent and half to other, and when offspring are bred to younger parent.—G. H. SHULL.

43. Root, F. M., Inheritance in the asexual reproduction of *Centroparyxis aculeata*. Genetics 3: 174-207. Mr., 1918.—This lobose rhizopod; like *Diffugia*, is favorable for study of inheritance in clonal lines because no growth or other changes take place in spine-bearing shell

after its formation. Numerous distinct races occur. Author started with 50 individual lines, of which 20 died in first month and remaining 30 lines were apparently all diverse. Followed only 4 lines further. Parent-offspring correlations within populations showed high correlation with respect to spine number (0.806), shell size (0.903) and mouth size (0.732), and low with respect to shell form (0.107) and mouth form (0.142). Grandparental correlation values were a little smaller.

Results within single clone ("line 30") of 749 individuals are similar and indicate that diversities in size of shell, size of mouth and number of spines are decidedly inherited, while diversities in form of shell and of mouth are only slightly inherited. Correlation between shell size and spine number is practically zero. Selections for high and low spine number gave in most cases progressive effect, but in one case whole effect resulted from first selection, after which no progress was made. Author attributes inconsistency of results in different experiments to difference of correlation in different strains between external appearance and genotypic constitution. Disapproves tendency to call all inheritable variations, mutations, and would restrict that term to variations which are fairly large. For lesser heritable variations author suggests "genetic fluctuations" or "micro-mutations."—G. H. SHULL.

44. Schmidt, Johs., Racial studies in fishes. I. Statistical investigations with *Zoarces viviparus* L. Jour. Genetics 7: 105-118. F., 1918.—Statistical and experimental investigations upon viviparous blenny have been conducted by author since 1914. Only statistical results presented in this paper. Over 25,000 specimens were examined with particular reference to (1) number of vertebrae; (2) number of rays in right pectoral fin; (3) number of hard rays in dorsal fin; (4) number of pigment spots in dorsal fin. First varied from 101 to 126; second, from 16 to 22; third, from 0 to 17; fourth, from 7 to 21. No difference was detected between sexes in respect to these characters and most characters exhibited high degree of constancy from year to year.

If *A*, *B*, *C* represent high values for number of vertebrae, hard rays and pigment spots, respectively, and *a*, *b*, *c* low values, six out of eight possible combinations *ABC*, *ABc*, etc. occurred in eighty populations analyzed. Dividing total geographic area considered, into four sections, each is in general characterized by particular combination of mean values. Despite many discrepancies in geographic distribution of mean values, rule seems to hold that average number of vertebrae, of hard rays and pigment spots, are essentially lower in fjords than outside, even at points few miles apart.

While *Zoarces* is thus split up into numerous local races, all eel populations of Europe are identical. Author accounts for this on ground that former spends whole life in same very restricted area,—which is very far from true of eel.

Viviparous habit of *Zoarces* made possible individual offspring analyses. In respect to vertebrae, number in various offspring samples can exhibit considerable variation among themselves, and differ greatly from average for population. Individual offspring analyses showed that smallest unit hitherto considered, the local "race," may be resolved into still smaller elements, expressed by means of offspring samples. These smaller elements may differ widely from one another, but when added together reproduce picture of race itself. Average values characterizing "race" are primarily dependent upon quantitative proportion between genotypes,—only secondarily on environment.

No direct correlation was found between number of vertebrae and salinity of medium; thus does not support hypothesis that racial characters are determined exclusively by environment. On other hand very distinct gradation of average qualities found in fjord populations suggests that surroundings may be of importance, either directly or indirectly, but factors coming into play not yet determine. Paper is illustrated by one plate and abundant graphs in text.—F. B. SUMNER.

45. Shamel, A. D., A dry blood-orange strain. Jour. Heredity 9: 174-177. Ap., 1918.—Study of bud variation in commercial orchard of "Ruby Blood" variety of common sweet orange, *Citrus sinensis*, a variety notable for its striking bud variations. Near top of a typical tree large limb was found having narrower and more lanceolate leaves and different habit from that characteristic of trees of this variety. Fruits borne on this limb appeared nor-

mal outwardly but when opened were straw-colored instead of deep blood, had thick rind and contained no juice whatever. Further search showed that this kind of bud sport was not uncommon and in some cases entire trees of this character were found. Occasionally typical blood oranges were found on the sporting branches. Oranges of this kind are not only worthless commercially but dangerous to reputation of growers of "Ruby Blood" oranges. Elimination is being practiced.—J. L. COLLINS.

46. Shamel, A. D., Striking orange bud variations. Jour. Heredity 9: 189-191. 2 pl. Ap., 1918.—Tree of "Thompson strain," which originated by bud variation from Washington Navel orange has for eight years produced bud variations. Selection from fruit-bearing bud wood has resulted in isolation of three strains, "Washington," "Corrugated" and "Thompson. Economically these three strains have very different values. Bud variation is considered frequent in Citrus varieties, and emphasis is laid on necessity of great care in selection of bud wood and of individual performance records.—J. A. HARRIS.

47. Shamel, A. D., Some variable ears of dent corn. Jour. Heredity 9: 29-32. Ja., 1918.—A number of unusual maize variations, including several "freak" forms of ears and one stalk abnormality are noted and illustrated. Suggests that such variations may be of importance to geneticists and urges that any unusual forms of maize be sent to investigators in U. S. Dept. Agric., universities or other institutions.—R. A. EMERSON.

48. Shamel, A. D., Chrysanthemum varieties. Jour. Heredity 9: 81-84. F., 1918.—List of thirty-nine parent varieties of chrysanthemums with new variety derived from each through bud variation, together with published authority for each variation. Gives brief history of chrysanthemum culture from 1688, when already found in Dutch gardens, to 1899 when there were 8800 varieties in Europe, with probably some duplication in names. Flowers of somewhat different color at opening from that shown later may often account for some supposedly different varieties. Obviously only those relatively constant under changed cultural conditions can be regarded as true bud variations. Only bud variations affecting bloom usually attract attention, but variations in vegetative parts are common. Variegated varieties are examples of bud variation in vegetative parts. Bud variation may be so complete that flower falls in another class, as carmine anemone from reflexed carmine, incurved white from reflexed white, and striped from solid color. Some varieties have not been known to produce bud variations. Some propagate true for periods of years and then bud variations occur, while other varieties apparently produce variations any season. Instances of different-colored flowers borne on same plant, different-colored petals in same flower, and variations in leaf shape and arrangement, which occurred at Riverside, California, in 1917, are mentioned.—A. C. ARNY.

49. Terao, H., Maternal inheritance in the soy bean. Amer. Nat. 52: 51-56. Ja., 1918. Crosses involving green and yellow cotyledon color showed maternal inheritance only. green cotyledon and seed-coat ♀ × ♂ yellow cotyledon and seed-coat showed maternal inheritance of seed-coat color; reciprocal cross gave Mendelian segregation, green dominant. Explanation based on assumption of two kinds of chlorophyll, one "Y" turning yellow at maturity, other "G" remaining green. Characteristics of chlorophyll due to heritable traits of chromatophores or cytoplasm. Seed-coat color due to pair of Mendelian factors, *H* prevents seed-coat becoming yellow when beans have yellow cotyledons "Y;" *h* permits change from green to yellow. *H h* have no effect in presence of green chlorophyll "G," seed-coats remaining green with both *H* and *h*.—VIGGO LUND.

50. Tupper, W. W., and H. H. Bartlett, The relation of mutational characters to cell size. Genetics 3: 93-106. Ja., 1918.—Summarizes cases of mutation in relation to accompanying changes in cell size. Gives measurements of epidermal cells of calyx, petals and filaments, and diameter of body of pollen grains, and number of germination pits, in *Oenothera pratincola* and two of its mutations, *latifolia* and *gigas*. Concludes that half-dwarf habit of mut. *latifolia* is not due to smaller cells, but to fewer cells. Cells of mut. *gigas* are larger than in parent, but number of cells is fewer, resulting in less proportionate increase in size of organs than in size of cells. Increase of cell size results in decrease of metabolic activity. Not all

gigas mutations are alike, some being half-dwarf. Such half-dwarfs may be at same time cell giants. Change in cell size is not same in all organs or parts and it is not possible to determine which characters are directly and which only indirectly due to doubling of chromosomes.—G. H. SHULL.

51. Valteau, W. D., Sterility in the strawberry. Jour. Agric. Res., 12: 613-670. Mr., 1918.—Study of flowers of strawberry, which show correlation between flower position, floral part number, and size of fruit; also between flower position and fertility of pistils. Species, progenitors of cultivated strawberry, largely diecious with variability of staminate and pistillate parts. Sterility by pollen abortion, not incompatibility of normally-developed gametes, considered to be various expressions of tendency toward dieciousness and not result of hybridization. Sterility of later flowers of inflorescence more general in hermaphrodites than in pistillates suggests former have been derived from staminate of diecious wild forms. Parthenogenesis does not occur. Two cases of fleshy receptacle developed without stimulus of fertilized embryos. Aborted pollen in wild *Fragaria virginiana* and *F. americana* rare; common in cultivated varieties. Percentage of aborted grains not constant in individual flowers of a variety or in individual anthers of a single flower. Pollen degeneration occurring after tetrad stage, at the time of rapid increase in cell size, considered to be due to differential ability of new chromosome combinations giving selective elimination of gametes.—D. F. JONES.

52. Whiting, P. W., Inheritance of coat-color in cats. Jour. Exp. Zool. 25: 539-569. Ap., 1918.—Author presents new data bearing on all familiar color variations of cats. Results are in harmony with earlier work indicating that maltese and cream dilution is unit recessive to intensity, black recessive to tabby, and yellow a sex-linked variation from black or tabby, the heterozygous color being as a rule tortoise shell. He found cases, however, in which heterozygous females were nearly self black, and, on other hand, a case in which yellow female bred consistently as if heterozygous. Whiting finds that self white variation is simple dominant over color. He finds no simple mode of inheritance for blue eyes and deafness, often associated with self white, but suggests that white spotting factors may produce these effects when present in self white. White spotting proved highly irregular in inheritance. Author gives most interesting analysis of tabby pattern. Ticking of individual hairs with yellow is dominant over black, variations in width of ticking being due perhaps to multiple allelomorphs. Another feature of tabby pattern, however, stripping of coat as a whole, is not determined by this factor, but merely revealed more clearly by it. In the stripes, there is alternate strengthening and weakening of black as opposed to yellow, revealed clearly in presence of factor for ticking, and also alternate intensity and dilution of color, seen best in yellow cats. The stripes are interpreted as due to waves of general metabolic activity. Spots are due to interference of longitudinal and transverse waves. Three segregating types of striping were found, very narrow or lined (epistatic to others), medium or tiger, and very wide or blotched. Evidence favors hypothesis of three allelomorphs but does not eliminate possibility that two sets of factors may be involved. In conclusion there is an interesting discussion of the probable origin of colors of cats and relation of these to different types of coat patterns in wild Felidae.—SEWALL WRIGHT.

53. Whiting, P. W., Sex-determination and biology of a parasitic wasp, *Hadrobracon brevicornis* (Wesmael). Biol. Bull. 34: 250-256. Ap., 1918.—Virgin females produce only males, mated females usually produce both sexes. Author concludes that fertilized eggs produce females. Male has haploid number of chromosomes. First spermatocyte division is abortive. Habits of insect, and variation in color pattern and sex ratio are described.—A. F. SHULL.

54. Wright, Sewall, Color inheritance in mammals. VIII. Swine. Jour. Heredity 9: 33-38. Ja., 1918.—Review of fragmentary observations and experiments, with attempt to put these disconnected data into logical scheme. White coat of Yorkshire and Chester red of Tamworth and Duroc Jersey, black with white points and occasional white splashes of Berkshire and Poland-China, belt of Hampshire and belted reds, wild coat of *Sus scrofa*, and

black of Hampshire and Essex, are tentatively explained by two independent allelomorphous pairs, Dd and Vv and set of triple allelomorphs, E_y , E_e , and E_h . Minor factors are assumed for intensity of red and restriction of black in red breeds, and minor factors for intensity of black and restriction of red in black breeds with white points. While suggestive, author points out more convincing data are necessary.—J. A. DETLEFSEN.

55. Wright, Sewall, Color inheritance in mammals. IX. The Dog. Jour. Heredity 9: 87-90. F., 1918.—Different colors and color patterns of the dog are discussed. Attempt is made to explain variations in colors and color patterns according to scheme given in Jour. Heredity 8: 373 (August, 1917). Black-eyed whites are probably comparable to black-eyed white mice and guinea-pigs. There are other whites due to dilution factor. Brown is recessive to black. Much more work is necessary before relations of many colors are solved.—E. ROBERTS.

56. Wright, Sewall, Color inheritance in mammals. X. The Cat. Jour. Heredity 9: 139-144. Mr., 1918.—Summarizes work which has been done on inheritance of color in cats. Solid white seems to be due to dominant factor. Dilution in maltese is due to simple recessive character, but inheritance of dilution in Siamese cat is not known. Tortoiseshell orange and pattern of common tabby cat are discussed. Scheme used in previous papers of this series on color inheritance in mammals, for explaining colors and color patterns, is employed in his paper.—E. ROBERTS.

HORTICULTURE

W. H. CHANDLER, *Editor*

57. Brooks, Charles, and J. S. Cooley, Effect of temperature aeration and humidity on Jonathan-spot and scald of apples in storage. Jour. Agric. Res. 11: 287-317. Pl. 32, 33. Nov. 12, 1917.—Covers experiments carried on in 1915-16, to determine factors influencing the development of Jonathan spot and apple scald. The two diseases are reported to be alike in the tissues affected, they have similar temperature responses and are similarly affected by aeration and humidity and by the maturity of the fruit. These similarities are great enough to suggest some close relationship in the fundamental causes of the two diseases. Both diseases were decreased by good aeration and by a fair degree of maturity and both were increased with a rise in temperature, the optimum being about 20° and the maximum about 30°C.

On Grimes and York Imperials apple scald developed in moist chambers at 0°, 5°, 10°, 15°, and 20°C. The rapidity of development increased with higher temperatures. In open containers no scald developed at any of the above temperatures except at 0°C. Apples stored in an atmosphere containing probably more than 5 per cent of carbon dioxide did not develop typical scald but developed a pungent alcoholic taste and finally broke down. The writers express the opinion that apple scald is largely due to abnormal conditions resulting from poor aeration. The occurrence of scald was accompanied by a decrease in total acids and sugars.

The rate of skin color development in Grimes apples was increased by a rise in temperature and it was checked by poor aeration and apparently but little affected by relative humidity. Scald was found more serious on green fruit than on ripe fruit but developed more rapidly on the latter. Delay in storage of immature fruit delayed and lessened the development of apple scald. It is pointed out that the effect of delayed storage depends largely upon the initial maturity of the fruit and the degree of aeration during the delay. Aeration appears to play a very important part in prevention of apple scald. This fact seems to furnish an explanation for the small amount of this disease usually found in cellars and air-cooled storages.—LAURENZ GREEN.

58. Brooks, Charles, and Fisher, D. F.. Irrigation experiments on apple-spot diseases. Jour. Agric. Res. 12: 109-137. Pl. 5. Jan. 21, 1918.—Deals with the effects of soil-water

supply upon bitter-pit, Jonathan spot and certain other nonparasitic spot diseases of the apple. It also includes notes upon the effect of maturity upon the development of these apple spot diseases in storage. These apple spots are not due to fungi or bacteria. They have been frequently found on unsprayed fruit, thus making the theory that spray materials are responsible for the trouble seem untenable.

The work reported was carried on at Wenatchee, Washington, where very little precipitation occurs from April to October, making the trees entirely dependent upon irrigation for their soil-water supply during the growing season. The amount of spotting was determined at picking-time and notes were taken to determine the increase in spotting in storage. The amount of internal discoloration was determined at the close of the storage period. These experiments included observations on fruits from trees which had received heavy, medium and light irrigation, and medium irrigation until August and then heavy irrigation the rest of the season. Heavy irrigation followed by light irrigation, alternating irrigations between heavy, medium and heavy and between heavy, medium, heavy and medium. The experimental data also include observations on the influence of size and growth upon spotting.

The early stages of Jonathan spot are confined to the color-bearing cells of the skin of the apple. Heavy irrigation greatly increased the disease but not so much as medium followed by heavy irrigation. Light irrigation greatly reduced the trouble but heavy followed by light irrigation resulted in the lowest percentage of the disease. Sudden changes in the amount of soil-water apparently did not increase the disease. Large apples showed greater susceptibility to bitter-pit than did small ones, but with Jonathan apples heavy irrigation had more influence on the disease than did the size of the fruit. With Grimes apples heavy irrigation seemed to increase the trouble on small apples more than on the larger ones. Apparently large apples are affected because of certain conditions under which they become large rather than merely because they are large. Early picked, immature fruit seem to show a greater susceptibility to Jonathan spot than later picked, more mature fruit. Bitter-pit on Jonathan apples was worse on fruits that were picked early than on those that were picked late.—LAURENZ GREEN.

59. Ridley, V. W., Factors in transportation of strawberries from the Ozark region, U. S. Dept. Agric., Bureau of Markets, Market Documents No. 8, M. 25, 1918—Results obtained are applicable to all strawberry-producing sections. The investigation included comparisons of prompt cooling, delayed cooling, precooling in transit, the effectiveness of false floors as an aid in refrigeration, a study of temperatures in transit and the manner of loading for best refrigeration. Careful picking and handling and prompt and thorough cooling was found necessary to reduce losses from decay in transit. The use of salt in the ice bunkers immediately after loading and again at the first re-icing, about twelve hours later, were found effective in hastening the rate of cooling in the car. About 2.5 per cent of the ice capacity of the bunkers at the first application and 1 per cent at the second application of salt is advised when the fruit is at a higher temperature than 60. If at a lower temperature less salt may be used. Loading crates higher than four layers in the car was found to decrease the keeping quality of the fruit and higher loading is not recommended. A new system of bracing in the center of the car is described, using wedges instead of long braces. This was found efficient, and gave an equal loading capacity without piling the crates so high.—LAURENZ GREEN.

MORPHOLOGY

E. W. SINNOTT, *Editor*

60. Allard, H. A., Abnormalities in *Nicotiana*. Bot. Gaz. 65: 175-185. 1918.—Various types of synanthry are described for a species of *Nicotiana* (presumably *N. alata* Link and Otto). In *N. Tabacum* catacorolla was found to be a common abnormality in plants affected with the mosaic disease. In such cases this abnormality is not inherited and is apparently due to external conditions. Other species of *Nicotiana* rarely show it in connection with the mosaic disease. Instances of two growing points and of an abnormal number of corolla lobes are also recorded.—E. W. SINNOTT.

61. Arber, Agnes, Further notes on intrafascicular cambium in Monocotyledons. *Ann. Bot.* 32: 87-89. 1918.—A summary of the cases of intrafascicular cambium which have been reported shows that this feature occurs in all but two of Engler's cohorts of Monocotyledons. A list of fourteen families is furnished. It is stated that the feature shows best in young stems at a very short distance from the growing apex, also sometimes in young leaves.—M. A. CHRYSLER.

62. Bower, F. O., Studies in the phylogeny of the Filicales. VII. The Pterioideae. *Ann. Bot.* 32: 1-68. 1918.—This paper is a continuation of the author's series on the phylogeny of the Filicales, and takes up the perplexing group of the Pterideae and their allies. Within the Pterideae of Prantl there are probably two distinct lines, the "Pterideae bi-indusiatae" (Pterid series), and the "Pterideae uni-indusiatae" (Cheilanthoid series). This paper is concerned chiefly with the former, and discusses the stelar structures and soral characters of *Lindsaya*, *Paesia*, *Pteridium*, *Lonchitis*, *Histiopteris*, *Anopteris*, *Pteris*, *Acrostichum*, and *Saccoloma*, drawing conclusions as to their phyletic positions. Either the outer or the inner indusium may be abortive in this series. Several members of the Dicksonioideae were also studied and steps in the abortion of the inner indusium were found. This fern series is believed to have sprung from some Schizaeoid source and to be related to the Pterid series as a collateral branch. It is noted that the point of origin of the sorus is apparently not always an absolutely constant character, since the ferns studied, though belonging to the Marginales, frequently show analogies with the Superficiales, due to a slide of the marginal sorus to a superficial position. The Superficiales, however, are believed to be ferns in which this slide took place so early in descent that the group is clearly distinct, phyletically.—E. W. SINNOTT.

63. Braun, E. Lucy. Regeneration of *Bryophyllum calycinum*. *Bot. Gaz.* 65: 191-193. 1918.—The author records an instance in *Bryophyllum calycinum* where leaves attached to the plant produced shoots and roots plentifully from their notches. In many leaves almost all the notches produced shoots. Neither of these occurrences has been noted in the studies of Loeb on this species.—E. W. SINNOTT.

64. Cribbs, J. E., A columella in *Marchantia polymorpha*. *Bot. Gaz.* 65: 91-96. *Pls. I, II*. 1918.—A columella-like structure was observed in specimens of the sporophytes of *Marchantia polymorpha*. This "columella" consists of a dense cluster of elaters in the mid-region of the capsule, and extends from its base for about two-thirds of its length. The sporogenous cells accompanying the young elaters became completely disorganized. Author compares this columella to the elaterophore of *Pellia*. The disorganization of the sporogenous cells, however, suggests a pathological condition; but author thinks peculiarities noted are not due to external factors.—The development of the normal young sporophyte was studied, and excellent figures are given. The latter agree closely with those of Meyer in his recent work on the Marchantiales (1916, Russian). Meyer figures the cap of sterile cells noted by the author and this has also been noted in a number of other Marchantiales; e.g., *Plagiochasma*, *Wiesnerella*, *Dumortiera*.—D. H. CAMPBELL.

65. Douglas, Gertrude E., The development of some exogenous species of agarics. *Amer. Jour. Bot.* 5: 36-54. 7 pl. 1918.—Since the gill development of agarics with a gill cavity has been quite thoroughly cleared up by Atkinson and others, the author has studied the following seven species which lack the universal veil; *Mycena subcalcalina* Atkinson, *Hygrophorus mineatus* Fr., *H. nitidus* B. & C., *H. borealis* Pk., *Entoloma flavifolium* Pk., *E. grayanum* Pk., and *E. cuspidatum* Pk. Aside from certain minor variations in the differentiation and development of stipe, pileus and gills, the early development in these seven species is the same. The gills arise at the stem, on the exposed under surface of the rudimentary pileus and extend centrifugally until the margin of the cap is reached. "Except for the fact that these gills develop on the exposed under surface of the pileus and not within a gill cavity, their method of origin is the same as that of the endogenous forms of the Agaricus type recently studied."—F. A. McALLISTER.

66. Fitzpatrick, H. M., Sexuality in *Rhizina undulata* Fries. Bot. Gaz. 65: 201-226. 1918.—*Rhizina undulata* is said to be parasitic on conifers, the cause of a root disease. The material for this investigation was found in pine woods at Ithaca, N. Y., where the fungus was found to form a white, mold-like growth enveloping the roots. Young fruits appear first as little white knobs of mycelium. When they attain a size of about 1 mm. in diameter, the archicarp make their first appearance, 3-8 in each ascocarp. Very shortly after, black spines grow out from deep-seated sterile tissue. All the cells of the ascocarp were found to be multinucleate from the first. The archicarps are loosely coiled or undulating threads, transformed from ordinary multicellular hyphae in the center of the ascocarp. They consist of from ten to nineteen cells each, multinucleate throughout, the nuclei increasing greatly in number by repeated divisions. Terminal cell of each archicarp is attenuated and at maturity its contents are disorganized. The author suggests that if it be a trichogyne it is no longer functional. There are no antheridia. When the archicarps are mature contiguous cells become continuous by the organization of a central pore in each septum. The nuclei migrate to the middle cells of the archicarp. From these middle cells (about half the total number) the ascogenous hyphae grow out. The nuclei in these hyphae are paired, but no conjugate divisions were observed. No nuclear fusions were seen in the archicarp and the author is of the opinion that a double nuclear fusion in the life history of none of the Ascomycetes has so far been demonstrated. The asci in *Rhizina* originate from croziers and into each young ascus there enters a pair of nuclei which very soon fuse. The cytology of the ascus was not investigated. In reviewing the conflicting views regarding the phenomena of sexuality in the Ascomycetes, the author points out that "the questions involved in the study of the nuclear history of the Ascomycetes will never be satisfactorily answered by a *a priori* argument," a weakness which he considers characterizes a good deal of the work of the past.—J. H. FAULL.

67. Hodgson, Robert W., An account of the mode of foliar abscission in Citrus. Univ. California Publ. Bot. 6: 417-428. 3 figs. 1918.—This paper, on the shedding of the young leaves of the "Washington Navel" orange, *Citrus sinensis*, and of the "Eureka" lemon, *Citrus Limonum*, covers a histological and cytological study of the abscission zone and separating layer prior to and during the process of abscission as distinguished from exfoliation. Citrus was studied because of its economic importance and because few data are available on abscission in thick walled tissues. The plants were greenhouse grown. The behaviour of the two species was similar. Abscission was induced by placing cuttings in a moist chamber, at room temperature, for 24-96 hours. The temperature and age of the material were important factors. The introduction of illuminating gas and CO₂ of varying concentrations did not materially alter the results.

The abscission zone, of 10-18 cell layers with the separation layer at the upper end, arises at or near the base of an internode, abscission occurring at the base of the terminal leaflet roughly opposite the grooved ring and also at the base of the petiole 8-10 cells distal to the grooved ring. Ring years no definite relation to location of abscission zone. Zone is pre-formed and ready to function upon proper stimulation. In young material there are no visible histological differences delimiting the zone. In older material the zone cells are smaller, isodiametric, and have denser contents than those adjoining. Abscission involves the separation of the cells along the middle lamella, but no cell divisions or elongations of the tertiary membranes were observed. All tissues across the petiole except the tracheae and the cuticle function in separation. Before abscission much starch is present in the zone cells, but this is largely withdrawn or used. After separation the cells continue growth and division and use any residue present. The first stage of the cell separation consists in a marked swelling and gelatinization, not only of the middle lamellae but of the entire walls with the exception of the tertiary membranes. Secondly, a dissolution of the gelatinized walls by hydrolysis occurs. There is little evidence that turgor plays any considerable rôle as a causal agent in the separation.—ELOISE GERRY.

68. Loeb, Jacques, Chemical basis of correlation. I. Production of equal masses of shoots by equal masses of sister leaves in *Bryophyllum calycinum*. Bot. Gaz. 65: 150-174. 1918.—This paper is a continuation of the author's studies of correlation in *Bryophyllum*.

Equal masses of sister leaves (fresh weight) were found to produce approximately equal masses of shoots in equal time and under equal conditions. This was shown by a series of experiments comparing the weight of shoots per unit of weight of detached sister leaves from which they grew (1) when both leaves were intact, (2) when both were divided into halves, (3) when one was intact and the other cut into four or more pieces, and (4) when one was intact and the other had its center removed. The number of shoots which were allowed to develop and the size of the pieces into which a leaf was cut were found to modify but slightly the weight of shoot produced by a given leaf. From an isolated leaf suspended in moist air a large number of shoots begin to grow. The one or two which start first persist and become large, thus inhibiting the growth of the others, presumably by attracting the bulk of the food material. Evidence is presented that the amount of available water determines where the first shoots shall be produced. These two factors (the limited amount of material available for growth and the automatic attraction of the material by the buds which grow out first) are held to explain the inhibiting effect of these buds on the growth of the others. No explanation of the mechanism for this attraction is suggested.—E. W. SINNOTT.

69. McNair, James B., Secretory canals of *Rhus diversiloba*. Bot. Gaz. 65: 268-273. 1918.—The intercellular resin passages of *Rhus diversiloba*, the "poison oak" of the Pacific slope, were found in the roots, stem, leaves and fruit in the phloem of the primary bundles and also in the secondary bast of the stem and root, in the phloem of the mesocarp of the fruit and in the hypocotyl and cotyledons of the embryo. Resin passages were not found in the anthers, pollen, xylem, epidermis, cork cells and trichomes, hence these parts are non-toxic. The canals originate schizogenously but a few cases were noted which indicated the possibility of lysigenous development. Tangential anastomoses of the resin ducts were noted, especially in the nodes. No essential difference in the anatomy which would explain the poisonous or non-poisonous character of the species of the Anacardiaceae was found. The fresh resinous sap emulsion of *R. diversiloba* is the only part of the plant capable of producing dermatitis. This is non-volatile but may be transported mechanically by the wind. (Other work on this point by the author is cited.) The liability of poisoning is greatest in spring, less in summer and fall and least when the plant is leafless.—ELOISE GERRY.

70. Sax, Hally Jolivette, Spore-formation in *Philocopra coeruleotecta*. Amer. Jour. Bot. 5: 61-78. Pl. 9-11. 1918.—Spore-formation in the 128-spored ascus of *Philocopra coeruleotecta* is essentially the same as in an 8-spored ascus. Beginning with the fusion nucleus in the ascus, seven successive mitotic nuclear divisions follow, and except for a decrease in size of the spindles no differences among them were noted. The author confirms Overton and others in finding that in multi-spored asci the spores originate by free-cell formation and that at first the nuclei of the young spores are beaked and adherent to the plasma membrane. The conclusion that there is little in common between a multi-spored ascus and a phycomycetous sporangium is quite in harmony with the established status of the 8-spored ascus.—J. H. FAULL.

71. Stoekey, Alma G., Apogamy in the Cyathaceae. Bot. Gaz. 65: 97-102. 1918.—Cases of apogamy previously reported are from families other than Cyathaceae, mostly from Polypodiaceae. A prothallium of *Dicksonia squamosa* showed no archegonia but two apogamous buds and numerous antheridia. Specimens of Cyathea presented unusual growths from the central cell of an archegonium. No conclusions could be drawn from cultural conditions as to the factors favoring apogamy.—M. A. CHRYSLER.

72. Tenopir, Lilian A., On the constancy of cell shape in leaves of varying shape. Bull. Torr. Bot. Club 45: 51-76. 1918.—In a study of the leaf cells of *Linum*, *Lobelia*, *Campanula*, and other forms the following conclusions are reached: The average cell size in a given tissue of a given variety or species is a fairly constant hereditary character, as certain other workers also have stated. Cell size depends in part upon the stage of development of the plant at the time the organ is formed; the size diminishes somewhat in a series of successively formed organs. Differences in the size of organs are due to differences in the number, not the size, of the cells. Hereditary size is therefore here dependent upon the rate and duration of cell

division.—The cells of the leaf have a characteristic length and breadth in a given species. Differences in leaf shape in the same plant or in a related species are not due to differences in *cell shape*, but to different numbers of cells along various axes. Leaf shape is therefore due to factors periodically limiting cell division in certain directions.—L. W. SHARP.

73. Thompson, W. P., Independent evolution of vessels in Gnetales and Angiosperms. Bot. Gaz. 65: 83-90. 1918.—The type of vessel believed to be highest in evolutionary scale is the so-called "porous" vessel, characterized by perforation of the end wall by a single large pore. This is found characteristically in the most advanced forms both of the Gnetales (Gnetum), and of the Angiosperms. Thompson shows that this structure has arisen in the two groups in different ways. In Gnetum the perforation has been formed by the enlargement and fusion of several irregularly placed bordered pits, and by the loss of the membranes. This is demonstrated by the nature of the vessels of the conservative regions, these being similar to those of Ephedra (the most primitive of the Gnetales), where perforation consists of the loss of membranes from otherwise nearly normal bordered pits; or of transitional nature between the two types, showing often half-formed large openings made up in part of membraneless rounded pits. Among Angiosperms the lower type of vessel is generally admitted to be that with scalariform perforations. This has arisen from the tracheid of lower forms in one of two ways: by the perforation of scalariform bordered pits of an ancient type of tracheid, or by fusion and perforation of the common circular multiseriate pits. The porous vessel has clearly been developed from the scalariform. Thus in both cases several bordered pits have become a single large perforation, but in Angiosperms a stage with narrow horizontal slits intervenes. There can be no genetical relationship between the vessels of these two groups.—Thus the vessel which has long and prominently been used as the connecting link between the highest Gymnosperms and the Angiosperms can no longer be evidence for relationship between these groups, even for their origin from a common vessel-possessing ancestor. Rather, we have a good example of the attainment by two groups of plants of the same level of evolutionary development of xylem.—A. J. EAMES.

74. Weston, W. H. The development of Thraustotheca, a peculiar water mould. Ann. Bot. 32: 155-173. Pl. IV, V, 2 figs. 1918.—The author gives a more complete and detailed description of this rare and somewhat anomalous genus of Saprolegnaceae than has heretofore appeared, considerably extending and supplementing the observations of previous writers as to its morphology, development and reproduction. The account is based, for the most part, on the direct examination of living material which was grown in pure cultures, both gross and microscopic. The formation and peculiar dehiscence of the sporangia, the several types of germination of the sporangiospores, the detailed structure and development of the zoöspores, the occurrence and significance of gemmae, the development and interrelation of the sex organs, the correlation between the presence of antheridia and the formation of eggs, and the relation of the reproductive activities to the supply of nutriment, are among the more important matters considered. The author concludes that the genus is related to Achlya rather than to Dictyuchus. The paper is fully illustrated.—R. THAXTER.

75. Whitaker, Edith S., Anatomy of certain goldenrods. Bot. Gaz. 65: 250-260. 1918.—A further contribution to our knowledge of the anatomical mechanism by which the herbaceous type of stele has been derived from the woody. Miss Whitaker demonstrates the origin of the herbaceous stem in the Compositae (Solidago). The woody tissue surrounding the leaf traces near their points of departure from the stele is transformed into "storage parenchyma." Radial bands of non-woody cells thus penetrate the vascular cylinder. These are subtended by the trace itself, beginning weakly some distance below the point of exit of the trace, becoming strongly developed, and ending abruptly just above the point where the trace passes out through the band. In cross sections these bands seem to split the stele into alternate broad "rays" and fibrovascular bundles. In the more slender upper parts of the stem, the vascular ring is thinner, and the storage parenchyma is necessarily limited to the sides of the trace. Thus a stele of more nearly equal separate bundles is formed. This demonstrates for a family at the top of the dicotyledonous series the working out of the same general principles, as have already been shown for lower forms—Betulaceae, Fagaceae, and Rosaceae.

The leaf trace bundles, when in the cortex, are shown to be bicollateral. The presence of internal phloem in this very conservative region suggests the idea that the Compositae formerly possessed internal phloem in the stem, as do the Cucurbitaceae and other high dicotyledonous families.—A. J. EAMES.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

76. Knowlton, F. H., Fossil floras of the Vermejo and Raton formations of Colorado and New Mexico. U. S. Geol. Surv. Prof. Paper 101. P. 223-437. Pls. 30-103. 1918.—Economically important coal-bearing formations of palustrine origin in the Raton Mesa country of north-eastern New Mexico and southeastern Colorado have long been worked. Geologists have disagreed regarding the age of these deposits. Following an extended account of the geology of the region by W. T. Lee, the fossil plants, which occur in abundance in association with the coal seams, are described by Knowlton. Two general horizons are recognized—the Vermejo formation, which is of late Upper Cretaceous age, and the Raton formation, of lower Eocene age.

The Vermejo flora comprises 108 species and includes a few doubtful fucoidal forms, an abundance of conifers, including *Sequoia* and *Widdringtonites*, a few ferns and monocotyledons, and numerous dicotyledons. *Ficus* and *Viburnum* appear to be the most diversified genera. New species are described in *Asplenium*?, *Osmunda*, *Sequoia*, *Cupressinoxylon*, *Sabal*, *Canna*?, *Juglans*, *Myrica*, *Salix*, *Populus*?, *Quercus*, *Ficus*, *Artocarpus*, *Credneria*, *Laurus*, *Amelanchier*, *Phaseolites*, *Colutea*, *Celastrus*, *Zizyphus*, *Sterculia*, *Pterospermites*, *Hedera*, *Vitis*?, *Cissites*, *Diospyros*?, *Viburnum*, *Palaeocaster*, and *Phyllites*. This flora is regarded as indicative of a warm, moist climate lacking marked seasonal changes.

The Raton flora comprises 148 species and includes a few *Polypodiaceae*, many large palms and numerous dicotyledons, particularly among the *Amentiferae*. New species are described in *Dryopteris*?, *Pteris*, *Asplenium*?, *Anemia*, *Alismaphyllites*, *Sabal*, *Geonoma*, *Juglans*, *Populus*, *Fagus*, *Quercus*, *Ficus*, *Artocarpus*, *Aristolochia*?, *Castalia*, *Magnolia*, *Laurus*, *Oreodaphne*, *Cinnamomum*, *Liquidambar*?, *Platanus*, *Cercocarpus*, *Prunus*, *Sophora*, *Cassia*, *Inga*, *Euphorbocarpum*, *Rhus*?, *Celastrus*, *Acer*, *Sapindus*, *Rhamnus*?, *Apeibopsis*?, *Tilia*, *Sterculia*, *Dombeyopsis*, *Vitis*, *Cissus*, *Aralia*, *Cornus*, *Andromeda*, *Chionanthus*, *Apocynophyllum*, *Viburnum* and *Phyllites*. The Raton flora is regarded as indicative of a moist, warm temperate climate and a prevailing swamp environment. The report is profusely illustrated.—BERRY.

PATHOLOGY

DONALD REDDICK, *Editor*

77. Allard, H. A., The mosaic disease of *Phytolacca decandra*. *Phytopath.* 8: 51-54. Fig. 1-2. 1918.—The disease resembles mosaic of tobacco in general symptoms, in communicability, incubation period, etc., but the two are not intercommunicable. The infective principle survives the winter in the underground portions and appears in the new shoots. There is every reason to believe that carriers of infection at times become active but the aphides that spread the tobacco mosaic are not agents for communicating this disease.—D. REDDICK.

78. Appleman, C. O., Investigations in progress. *Plant Physiology*. Maryland Agric. Exp. Sta. Ann. Rept. 30: viii-ix. Ja., 1918.—Studies of the abnormal carbohydrate metabolism in potatoes affected with the spindling-sprout disease are mentioned.—J. B. S. NORTON.

79. Bakke, Arthur L., Longevity of *Helminthosorium teres*. (Abstract.) *Phytopath.* 8: 80. 1918.—Organism in pure culture in a test tube remained alive from January, 1911, until November, 1917.—D. REDDICK.

80. Ballard, W. R., Investigations in progress. Pomological and small fruit investigations. Maryland Agric. Exp. Sta. Ann. Rept. 30: x-xi. Ja., 1918.—Some vinifera type grapes grew well, others died. Mildew was very injurious to some grape varieties. Seedlings of "Clinton" crossed with tender vinifera varieties were hardy and mildew resistant. Quinces blighted severely. Blackberry varieties differ in injury from rust, double blossom and winter injury. Nutt and Ricard type of geraniums seem more disease resistant.—J. B. S. NORTON.

81. [Besley, F. W.], Report of the Maryland State Board of Forestry for 1916-17, p. 17-24, 45, 71-86. 1918.—A tabulation of the forest fires of the State for the two years shows that 305 fires burned over 60,547 acres of timber, valued at about \$110,999. Extensive investigation of the white pine plantings and nurseries for two seasons failed to reveal the blister rust in Maryland.—J. B. S. NORTON.

82. Brooks, Charles, and J. S. Cooley, Air movement as a factor in the prevention of apple scald. (Abstract.) Phytopath. 8: 69. 1918.—Apples stored at 15°C. in practically saturated atmospheres containing 1.5 to 5 per cent CO₂ scald badly where there is no air movement but have remained free when the air is kept in constant motion.—D. REDDICK.

83. Brooks, Charles, and D. F. Fisher. Soft scald of apples and cherries. (Abstract.) Phytopath. 8: 68-69. 1918.—Scald increases with an increase of CO₂ content of container or a rise in temperature. Red color of the skin fades and softening and browning of flesh follows. Mechanical injuries are centers. A film of moisture favors development of scald.—D. REDDICK.

84. Burkholder, W. H., I. M. Hawley, and E. W. Lindstrom. Some results of the New York State bean investigation. Proc. New York State Fruit Growers' Assoc. (17th Ann. Meet.) 16: 120-125. 1918.—Under the sub-title, Diseases of beans and the improvement of the crop through breeding, is discussed in a semi-popular way: dry root rot, caused by *Fusarium* sp.; Rhizoctonia root rot; black root rot, caused by *Thielavia basicola*; anthracnose and mosaic. An anthracnose-resistant white marrow bean is reported. Mosaic is most common in the field on pea and medium beans.—D. REDDICK.

Butler, O., On the preservation of phytopathological specimens in their natural colors. Phytopath. 8: 66-68. 1918.—A specimen jar of appropriate size is filled with a 1 per cent. solution of sodium bisulphite; citric acid (or other acid, preferably organic) is then added until a strong odor of sulphur dioxide is given off, then the specimen to be preserved is placed in the solution and the jar sealed. At the end of 0.5-2 hrs. (sometimes longer) the jar is opened, the bleaching solution immediately poured off, replaced once with water and then with a 4 per cent solution of formaldehyde. The specimen is to remain permanently in this solution. The bleaching solution should be allowed to act only until the color most difficult to retain begins to fade.—D. REDDICK.

86. Carpenter, C. W., Report of the Plant Pathologist. Rept. Hawaii Agric. Exp. Sta. 1917: 33-42. p. IV and V. Ap., 1918.—The following diseases of the Irish potato have been identified in Hawaii: Late blight (*Phytophthora infestans*), wilt (*Fusarium oxysporum*), rosette and scurf (*Rhizoctonia solani*), tuber rot (*Fusarium oxysporum* and *F. radicicola*), and a new foliage disease apparently induced by a species of mite. Bordeaux mixture is demonstrated effective in controlling *Phytophthora infestans*.—The occurrence of a disease of bananas similar to the Panama wilt is noted and other banana maladies are mentioned. Other diseases identified are as follows: Bean, anthracnose, (*Colletotrichum lindemuthianum*); celery, late blight, (*Septoria petroselinii* var *apii*); sweet potato, scurf (*Monilochaetes infusans*), soft rot, (*Rhizopus* sp.—and *Fusarium solani*), leaf spot (*Septoria bataticola*); tomato leaf spot, (*Septoria lycopersica*), blight, (*Phytophthora infestans*).—C. W. CARPENTER.

87. Chandler, W. H., Influence of low temperature on fruit growing in New York State. Proc. New York State Fruit Growers' Assoc. (17th Ann. Meet.) 16: 186-194. 1918.

88. Chapman, G. H., Mosaic disease of tobacco. Massachusetts Agric. Exp. Sta. Bull. 175: 69-117. Pl. I-IV. My., 1917.—A brief review of the work of previous investigators and the results obtained by the author relating to the cause, reactions of the causal agent, and

experimentally its close parallelism to enzymatic processes. The author holds that the disease is not caused by an organism, at least in the ordinary concept of that term. It is also shown that the primary infection occurs in a majority of cases in the seed-bed. Results obtained by the excessive use of fertilizer constituents and lime apparently do not indicate any relationship to the intensity of the disease. The effect of colored light on the disease is also discussed, and, contrary to Lodewijks' results, no control was indicated, although the visible symptoms of the disease were in some cases suppressed. Specific methods for control are recommended.—P. J. ANDERSON.

89. Coons, G. H., and F. A. Spragg, Resistance and susceptibility of certain wheat varieties to loose smut. (Abstract.) *Phytopath.* 8: 60-70. 1918.—Variety "Going's" much more susceptible to *Ustilago tritici* than "Shepherd's Perfection." D. REDDICK.

90. Corry, E. N., and P. Garman, Investigations in progress. Maryland Agric. Exp. Sta. Ann. Rept. 30: xiii. Ja., 1918.—Treats briefly of the relation of a mite *Tarsonemus pallidus* to leaf spots of geranium and other plants.—J. B. S. NORTON.

91. Doolittle, S. P., and W. W. Gilbert, Further notes on cucumber mosaic disease. (Abstract.) *Phytopath.* 8: 77-78. 1918.—The infective principle apparently does not overwinter in soil or seed. Striped beetles carry it, as do pickers. The disease has been communicated to 18 species in 10 genera of Cucurbitaceæ. Attempts to control the disease have not met with success.—D. REDDICK.

92. Durrell, L. W., Factors influencing the uredospore germination of *Puccinia coronata*. (Abstract.) *Phytopath.* 8: 81-82. 1918.—Spores must lie in a film of water. They do not germinate in a moist atmosphere nor submerged in water, nor do they germinate in the absence of oxygen. Cardinal temperatures are: min. 0 to 2°C., opt. 18 to 22°C., max. 35°C.—D. REDDICK.

93. Durst, C. E., Tomato selection for *Fusarium* resistance. (Abstract.) *Phytopath.* 8: 80. 1918.—As a result of selection, strains have been developed, from varieties possessing desirable market characteristics, which are capable of living through the season in thoroughly infested soil.—D. REDDICK.

94. Edgerton, C. W., A study of wilt resistance in the seed-bed. *Phytopath.* 8: 5-14. Fig. 1-4. 1918.—Experiments with *Fusarium lycopersici* on tomato in sterilized, reinoculated soil. Seedlings of susceptible strains grown in pots go down very rapidly under such conditions and may be eliminated quickly. The method is as reliable as that of growing plants in the field. Data regarding varietal resistance to disease, virulence of various cultures of the wilt fungus, and the effect of different soils and different substances in the soil on the development of the organisms are presented.—D. REDDICK.

95. Edgerton, C. W., Delayed ripening of tomatoes caused by spraying with Bordeaux mixture. (Abstract.) *Phytopath.* 8: 69. 1918.—Use of Bordeaux mixture delays ripening of fruit. Financially the control of *Alternaria solani* and *Cladosporium fulvum*, except in epiphytotic years, is more than offset to the market gardener by delayed ripening of fruit.—D. REDDICK.

96. Faulwetter, R. C., The *Alternaria* leaf-spot of cotton. *Phytopath.* 8: 98-105. Fig. 3. 1918.—A species of *Alternaria*, perhaps *A. tenuis* Nees, is shown by experimentation to be a weak parasite on the leaves of cotton (*Gossypium* sp.). Under favorable conditions it may attack uninjured leaves but it usually follows in the lesions of *Bact. malvacearum* or injuries by red spider. The lesions are first pale green, later straw yellow and finally rusty brown. They have a brittle, papery texture and irregular, concentric-ridged zonations.—D. REDDICK.

97. Fernald, H. T., White pine blister rust work. Ann. Rept. [Massachusetts] State Nur. Inspector (1917) 16: 3-9. Ja., 1918. [Also in 65th Ann. Rept. Massachusetts State Bd. of Agric.]—Summary of scouting and eradication measures during 1917 and details of plan and organization of the work. Every town in the State has been scouted for cultivated *Ribes* and all diseased ones (about 30,000) removed. Work was begun too late to do much with

pinus. Three eradication areas, covering several towns, were established in and around which all *Ribes*, whether diseased or not, were destroyed. The condition in Massachusetts is considered serious. During 1916-1917 blister rust has been found on *Ribes* in 265 towns and on pines in 72 towns. Accompanying maps show pretty general distribution throughout the State but least in the central part.—J. P. ANDERSON.

98. Fromme, F. D., Relative susceptibility of beans to rust. (Abstract.) *Phytopath.* 8: 76. 1918.—Of fifty varieties of beans tested (names not given), most proved susceptible to *Uromyces appendiculatus*, while a few may be classed as rust resistant and a few as very susceptible.—D. REDDICK.

99. Galloway, Beverly T., Some of the broader phytopathological problems in their relation to foreign seed and plant introduction. *Phytopath.* 8: 87-97. 1918.—An elaboration on three lines of thought, based on the author's intimate acquaintance with the development of the U. S. Dept. Agric. and of Phytopathology in that department, as follows: (1) The work is international; no broad phytopathological problems are local. (2) Regulatory and restrictive measures must be regarded as palliative at best. (3) Plant hygiene, a systematic, organized, coördinated study of crops in their relation to environment offers the broadest field for research and applied science.—D. REDDICK.

100. Gardner, M. W., and W. W. Gilbert, Cucumber angular leaf-spot and anthracnose overwintering and seed treatment control. (Abstract.) *Phytopath.* 8: 79-80. 1918.

101. Garner, W. W., and D. E. Brown, Investigations in progress. Tobacco. Maryland Agric. Exp. Sta. Ann. Rept. 30: xix-xx. 1918.—A disease similar to the root rot was found affecting legumes and all Maryland varieties of tobacco. Seeding of "Maryland Mammoth" tobacco was delayed on the infested soil. "Connecticut Broadleaf" is practically immune.—J. B. S. NORTON.

102. Godfrey, G. H., *Sclerotium rolfsii* on wheat. *Phytopath.* 8: 64-66. *Fig. 1.* 1918.—Brown lesions on the crown and lower portions of the culm accompanied by a failure to produce kernels. *S. rolfsii* isolated and pathogenicity strongly indicated as a result of inoculation experiments performed on a small scale in greenhouse.—D. REDDICK.

103. Harter, L. L., and J. L. Weimer, Storage rots of sweet potatoes. (Abstract.) *Phytopath.* 8: 73. 1918.—A list of twenty-five organisms that have been tested for ability to produce decay.—D. REDDICK.

104. Harter, L. L., and J. L. Weimer. A surface storage-rot of sweet potatoes. (Abstract.) *Phytopath.* 8: 73. 1918.—Disease is caused by *Fusarium hyperoxysporum* or a closely related species. Infection occurs at digging time apparently through dead or dying rootlets. Lesions develop slowly, are shallow, somewhat sunken, brownish in color and irregular in shape.—D. REDDICK.

105. Hartley, Carl, *Rhizoctonia* as a needle fungus. *Phytopath.* 8: 62. 1918.—Notes a rare case of *Rhizoctonia* sp. occurring on needles of Douglas fir (*Abies*) and causing conspicuous, reddish lesions. The organism differs from *Corticium vagum* var. *solani* only in having smaller sclerotia. It is thought to be a parasite but no infection experiments were attempted.—D. REDDICK.

106. Hopkins, E. F., The disease of tulips caused by *Botrytis parasitica*. (Abstract.) *Phytopath.* 8: 75. 1918. The disease is widespread in U. S. A. It may be distinguished from other similar diseases by the minute pin-head-sized sclerotia of the pathogene. The organism is a restricted parasite.—D. REDDICK.

107. Jagger, Ivan C., Hosts of the white pickle mosaic disease of cucumber. *Phytopath.* 8: 32-33. 1918.—The white pickle type of mosaic was transferred to a number of species and numerous horticultural varieties of the family Cucurbitaceae and to *Helianthus debilis* and *Lobelia erinus* var. *gracilis*.—D. REDDICK.

108. Jagger, I. C., Mosaic diseases of cucurbits. (Abstract.) *Phytopath.* 8: 74-75. 1918.—The white-pickle type of mosaic has been transferred to a large number of species and

varieties in the family *Cucurbitaceæ* and to one species each in the families *Lobelaceæ* and *Compositæ*. The mottle-leaf type has been transferred to a few species and varieties of *Cucurbitaceæ*. A third type of mosaic has been found.—D. REDDICK.

109. Jagger, J. C., and V. B. Stewart, Some *Verticillium* diseases. *Phytopath.* 8: 15-19. 1918.—Cultural studies of, and cross inoculations with *Verticillium* sp. isolated from eggplant (*Solanum melongena*), *Berberis thunbergii*, salsify (*Tragopogon porrifolius*), potato (*Solanum tuberosum*) and maple (*Acer rubrum*). Organism is closely related to, but apparently not, *V. albo-atrum* R. & B. Inoculations also made on various varieties and species of *Solanaceæ*. The cultures from eggplant, barberry, salsify and species of *Solanum* are indistinguishable in rate of growth, macroscopic appearance, and formation of sclerotium-like bodies. The fungus from maple differs in the rate of formation of sclerotium-like bodies.—D. REDDICK.

110. Jagger, I. C., and V. B. Stewart. Some *Verticillium* diseases. (Abstract.) *Phytopath.* 8: 75. 1918.

111. Jehle, R. A., Susceptibility of *Zanthoxylum clava-hercules* to *Bacterium citri*. *Phytopath.* 8: 34-35. 1918.—Susceptible when organism is introduced in needle prick.—D. REDDICK.

112. Johnson, James, Wilt disease of tobacco attributed to *Fusarium*. (Abstract.) *Phytopath.* 8: 76-77. 1918.—Evidence is presented for believing that the disease is caused by *Fusarium* sp. and not by bacteria, but artificial infection has not been secured.—D. REDDICK.

113. Johnson, James, and B. E. Hartman, Influence of soil temperature on *Thielavia* root-rot. (Abstract.) *Phytopath.* 8: 77. 1918. Root-rot of tobacco occurs sparingly or not at all at temperatures above 23-26°C. Diseased plants transferred to a soil of this temperature or higher temperature develop new roots which are free from disease.—D. REDDICK.

114. Jones, L. R., Laboratory outlines in plant pathology. *Phytopath.* 8: 60-61. 1918.—Review of book by H. H. Whetzel, Lex R. Hesler, Chas. T. Gregory and W. Howard Rankin.

115. Jones, L. R., W. W. Gilbert, and M. W. Gardner, Lightning injury to crops. Records of observation. (Abstract.) *Phytopath.* 8: 80. 1918.

116. Keitt, G. W., Third progress report on investigations of leaf spot of cherries and plums in Wisconsin. (Abstract.) *Phytopath.* 8: 72-73. 1918.—Spraying experiments show that the disease can be controlled with Bordeaux mixture as weak as 2: 2: 50, and with lime-sulfur solution diluted 1: 40 (Arsenate of lead was used in combination). Certain proprietary sulfur preparations were not so effective. Destruction of fallen leaves before blossoms open helps reduce the amount of disease.—D. REDDICK.

117. Kempton, F. E., and H. W. Anderson, Quince rot. (Abstract.) *Phytopath.* 8: 71. 1918.—A fungous disease, but organism not identified. The fruits are first gray, later purplish and finally brown.—D. REDDICK.

118. Lyman, G. R., The relation of phytopathologists to plant disease survey work. (Abstract.) *Phytopath.* 8: 78-79. 1918.

119. Massey, L. M., Experiments for the control of blackspot and powdery mildew of roses. *Phytopath.* 8: 20-23. 1918.—Use of bordeaux mixture, lime-sulfur solution, cupra-ammonium wash, and sulfur-lead-arsenate dust, on eight varieties, for control of these diseases (caused by *Diplocarpon rosæ* Wolf and *Sphærotheca pannosa* var. *rosæ* Wor.), in well controlled experiments in nursery row and garden. Bordeaux mixture (4: 4: 40) and sulfur-lead-arsenate dust (90: 10) proved decidedly superior for blackspot and the dust mixture much better for control of mildew.—D. REDDICK.

120. Massey, L. M., Dry rot of gladiolus. (Abstract.) *Phytopath.* 8: 71-72. 1918.—A fungous disease. Organism referred to genus *Sclerotium*. Corms become infected in field and mummify in storage. Lesions are small, more or less circular with a definite margin and of brown to brownish black color.—D. REDDICK.

121. McClintock, J. A., Spinach blight. (Abstract.) *Phytopath.* 8: 74. 1918.—A specific disease, which can be transferred to healthy plants.—D. REDDICK.
122. McKay, M. B., and Venus W. Pool, Field studies of *Cercospora beticola*. *Phytopath.* 8: 119-136. *Fig. 1-2*. 1918.—*Martynia louisiana* is a new host. The organism is spread to some extent by the air, insects and irrigation water. It is killed by passage through the alimentary tract of cattle, by heating at 100°C. for 30 min. and by ensiling. In sugar beet fields primary infection may come from beet balls or debris of other hosts but chiefly from old beet top material left on the ground from the previous season. Careful removal of infected beet tops after harvest delays the appearance of the disease in non-rotated fields the following season and reduces the injury therefrom. Some American grown seed is heavily infected, lesions appearing on the cotyledons. Treatment with formaldehyde (commercial, 40 per cent) 15: 1000 for 7 min., is effective and not injurious to the seed.—D. REDDICK.
123. McCubbin, W. A., Dispersal distance of urediniospores of *Cronartium ribicola* as indicated by their rate of fall in still air. *Phytopath.* 8: 35-36. *2 graph.* 1918.—Spores fell a distance of 8 feet in still air in 4-5 min. Possible distance of dispersal by wind of various velocities is calculated.—D. REDDICK.
124. Melchers, L. E., Botrytis sp. causing severe injury to flowers and foliage of *Pelargonium hortorum*. (Abstract.) *Phytopath.* 8: 76. 1918.
125. Melchers, Leo E., and John H. Parker, Three varieties of hard red winter wheat resistant to stem rust. (Abstract.) *Phytopath.* 8: 79. 1918.
126. Melhus, I. E., Seed treatment with hot solutions of formaldehyde and mercuric chlorid. (Abstract.) *Phytopath.* 8: 81. 1918.—Solutions of formaldehyde and of mercuric chlorid, 2 pints in 30 gal. of water and 2 ounces in 15 gal. of water, respectively, held at 48 to 50°C. for 5 min., have proved fully effective for the control of common scab (*Oospora*) of potatoes. Oat smut was prevented by treatment for 1 min. with 1 part formaldehyde solution to 320 parts of water at temperatures of 45, 50, 55, and 60°C. Barley stripe disease was practically eliminated by treatment of seed for 5 min. at a temperature of 50°C. with formaldehyde 1: 320 or mercuric chlorid 1: 1000.—D. REDDICK.
127. Morse, Warner J., How to control potato enemies. *Quarterly Bulletin Maine Department of Agriculture* 18: 23:40. 1918.—[Reprint of Miscellaneous Publ. 535 of the Maine Agric. Expt. Sta., March, 1918, with the same title but authorship not given.] Enumerates the principal potato diseases known to occur in the state and discusses methods of control.—W. J. MORSE.
128. Munn, M. T., Pathogenicity of *Bacillus amylovorus* (Burr.) Trev. for blossoms of the strawberry (*Fragaria* sp.). *Phytopath.* 8: 33. 1918.—Secured infection by artificial inoculation with atomizer. Disease has not been noted in nature.—D. REDDICK.
129. Norton, J. B. S., Investigations in progress. Botany and plant pathology. Maryland Agric. Exp. Sta. Ann. Rept. 30: vii-viii. Ja., 1918.—Investigations in progress on tomato blight caused by *Septoria lycopersici*; the effect of copper sulfate acting through the root on the resistance of tomatoes to the above fungus; brown rot of peaches; fusarium resistant tomatoes; and the State Plant Disease Survey, are reported. The apothecial stage of the brown rot fungus was abundant after the entire absence of peaches the previous year.—J. B. S. NORTON.
130. Orton, W. A., Organization and correlation of research and extension work in plant pathology. (Abstract.) *Phytopath.* 8: 78. 1918.
131. Osmun, A. Vincent, and W. S. Krout, A new *Sclerotium* disease of lawn grasses. (Abstract.) *Phytopath.* 8: 72. 1918.—The disease is primarily one of young grasses, resulting in so-called burning-out. Organism has been isolated and infection secured on *Agrostis alba*, *Phleum pratense*, *Cynosurus cristatus*, *Lolium perenne*, *Trifolium hybridum*, *T. pratense*, *T. repens*, *Melilotus officinalis*, *M. alba*, *Medicago sativa*, and *Vicia* sp.—D. REDDICK.

132. Potter, Alden A., and G. H. Coons. The species of *Tilletia* on wheat. (Abstract.) *Phytopath.* 8: 72. 1918.
133. Potter, Alden A., and G. W. Coons.—Differences between the species of *Tilletia* on wheat. *Phytopath.* 8: 106-112. *Fig. 1-4.* 1918.—*Tilletia laevis* (B. & C.) Schrot. (*foetens*) and *T. tritici* (Bjerk.) Winter are shown to be generally confused in literature, exsiccati, etc. *T. laevis* causes a shortening of the culms of from 6 to 8 cm., heads are small, more slender and open than normal, sori produced only where kernels would be produced, sori oblong, consistency of smut mass unctuous. *T. tritici* causes a shortening of the culm of about 30 cm. heads enlarged, usually all apical florets bear sori, sori elliptic to round, consistency of smut mass friable. The distribution of the two species may account for confusion in regard to certain control measures, soil infestation, destruction of threshing machines, and varietal susceptibility.—D. REDDICK.
134. Potter, Alden A., and Leo E. Melchers, Resistance of sorghum types to covered kernel smut. (Abstract.) *Phytopath.* 8: 71. 1918.—None of the commercial types of *Jorghum vulgare* is immune to *Sphacelotheca sorghi*. Milo and feterita are highly resistant, as are a number of the durras and a dwarf kaoliang variety.—D. REDDICK.
135. Ramsey, G. B., Influence of moisture and temperature upon infection by *Spongospora subterranea*. *Phytopath.* 8: 29-31. 1918.—All combinations of three temperatures (60, 70, and 80° F.) and three conditions of soil moisture (dry, moist and wet) were tried. Soil infested with *S. subterranea*, "Green Mountain" potatoes used. Infection occurred only in the moist and wet cultures at the lowest temperature (five out of six pots).—D. REDDICK.
136. Reddick, Donald [and F. C. Stewart], Pathological aspects of the freight-rate classification on peaches. *Proc. New York Fruit Growers' Assoc.* (17th Ann. Meet.) 16: 12-19. 1918.—An essay, outlining investigations in pathology that should be made in order to form a basis for fair settlement of damage-in-transit claims. F. C. Stewart is joint author but his name was arbitrarily omitted by the editor.—D. REDDICK.
137. Reynolds, Harris A., White pine blister rust. Published by the Committee on the Suppression of the Pine Blister Rust in North America. *Ja.*, 1918.—A compilation of reports submitted to the committee at the Pittsburgh conference in November, 1917, by those in charge of the blister rust work in the several states, a summary of the situation by H. Metcalf, a report of scientific investigation by Perley Spaulding, and resolutions of the committee. The territory west of the Mississippi river and south of Ohio and Pennsylvania is free of the disease. Only local infections occur in the central western states. In the New England states, New York and parts of Ontario, the disease is pretty generally distributed. The committee recommends continued scouting in the far west to prevent the disease entering, eradication in the middle west and experiments looking toward local control in New England.—P. J. ANDERSON.
138. Roberts, John W., Plum blotch. (Abstract.) *Phytopath.* 8: 74. 1918.—*Phyllosticta congesta* Heald & Wolf said to cause the disease. Lesions occur on fruit, leaves and probably the twigs of Japanese varieties of plums.—D. REDDICK.
139. Smith, Loren B., Insect transmission of spinach blight. (Abstract.) *Phytopath.* 8: 74. 1918.—The disease is communicable and is transmitted by several species of insects.—D. REDDICK.
140. Stakman, E. C., and G. R. Hoerner. *Puccinia graminis stritici-compacti* in southern United States. (Abstract.) *Phytopath.* 8: 77. 1918.
141. Stevens, F. L., Some meliocolous parasites and commensals from Porto Rico. *Bot. Gaz.* 65: 227-229. *Pl. 5-6, figs. 1-5.* 1918.—See abstract under Taxonomy of Non-Vascular Cryptogams.
142. Stewart, F. C., The *Phoma* blight of red cedar. *Phytopath.* 8: 33-34. 1918.—Record of the occurrence of *Phoma* sp. on *Juniperus virginiana* in Iowa in 1896.—D. REDDICK.

143. Stewart, F. C., and A. J. Mix, Blackheart and the aeration of potatoes in storage. New York [State] Agric. Exp. Sta. Bull. 436. Je., 1917.—The fundamental cause of blackheart in potatoes is a lack of oxygen sufficient for the needs of respiration. Blackheart may occur at any temperature above 45°C. provided air is partially or wholly excluded from the potatoes for a sufficient length of time. With a volume of air equal to the volume of the tubers and a temperature of 21°C. confinement of tubers in hermetically sealed jars for 10 or 12 days is sufficient to produce well-marked blackheart. At 12-16°C. about twenty days are required and at lower temperatures a still longer time. The deep piling of potatoes in storage without provision for ventilation is frequently a cause of blackheart.—F. C. STEWART.

144. Stewart, V. B., Dusting experiments in 1917. Phytopath. 8: 63-64. 1918.—Leaf spot of quince caused by *Fabrea maculata* (Lév.) Atk. and leaf-blotch of horse-chestnut, caused by *Guignardia esculi* (Pk.) Stewart were controlled under conditions of extreme infection with dust mixture consisting of 95 parts finely ground sulfur and 5 parts powdered arsenate of lead. A mixture of 90 parts sulfur and 10 parts hydrated lime was not so satisfactory.—D. REDDICK.

145. Stone, R. E., Orange rust of Rubus in Canada. Phytopath. 8: 27-29. Fig. 1. 1918.—Occurrence of *Gymnoconia interstitialis* (Schlect.) Lag. noted on species of Rubus in Canada, especially Ontario. Aeciospore germination figured.—D. REDDICK.

146. Vaughan, R. E., and J. W. Brann, Potato seed treatment. (Abstract.) Phytopath. 8: 70. 1918.—Mercuric chlorid loses strength with successive treatments especially when tubers are dirty. Of the varieties tested "Rural New Yorker" was most resistant to *Oospora scabies*.—D. REDDICK.

147. Walker, J. C., Control of neck rot and anthracnose of onion sets. (Abstract.) Phytopath. 8: 70. 1918.—Drying the stock at harvest time at 90-120°F. for 48-72 hrs. is effective.—D. REDDICK.

148. Walker, J. C., Notes on the resistance of onions to anthracnose. (Abstract.) Phytopath. 8: 71-72. 1918.—White onions are susceptible whereas red and yellow varieties are decidedly resistant to the anthracnose organism. Coloring matter is in solution in the cells and is easily extracted with water. Such extract inhibits spore germination. There is a close correlation between coloring matter, inhibition of germination and resistance.—D. REDDICK.

149. Weir, James R., New hosts for *Razoumofskya laricis*. Phytopath. 8: 6-63. 1918.—New hosts are *Picea engelmanni*, *Abies lasiocarpa* and *Pinus albicaulis*.—D. REDDICK.

150. Weir, James R., and Ernest E. Hubert, A note on *Hyalosporæ*. Phytopath. 8: 37-38. 1918.—Evidence to indicate that *Hyalospora polypodii* on *Woodsia scopulina* and *H. aspidiotus* on *Phegopteris dryopteris* are autoecious.—D. REDDICK.

151. Weir, James R., and Ernest E. Hubert, Notes on the overwintering of forest tree rusts. Phytopath. 8: 55-59. 1918.—The data presented indicate that *Melampsora bigelowii* on *Salix* spp. *Melampsoropsis pyrolæ* on *Pyrola*, *Melampsoridium betulæ* on *Betula* sp., *Pucciniastrum* spp. on *Epilobium adenocaulon* and *P. pyrolæ* on *Pyrola*, winter over by means of the uredinial stage. It is thus possible to explain the repeated occurrence of these normally heteroecious rusts in regions far removed from their alternate hosts.—D. REDDICK.

152. Weir, James R., and Ernest E. Hubert, *Cronartium coleosporioides* on *Pedicularis groenlandica*. Phytopath. 8: 63. 1918.—Three genera are now listed as hosts, namely *Castilleja*, *Orthocarpus* and *Pedicularis*.—D. REDDICK.

153. Weir, James R., and Ernest E. Hubert, Notes on forest tree rusts. Phytopath. 8: 114-118. 1918.—*Melampsorella elatina* (A. & S.) Arth. in its aecial stage causes harmful witches-brooms and a dwarfing of tips and branches. Cultural studies indicate the *Peridermium coloradense* (Dietel) A. & K. on *Picea engelmanni* is identical with *M. elatina* on *Abies lasiocarpa* and *A. grandis*, the teliospores occurring on *Stellaria borealis*. *Pinus excelsa* is a new host.—*Peridermium holwayi*, *P. ornamentale* and *P. columnare* are considered identical and are referred to *Calypsotheca Columnaris*—Aeciospores of *Melampsora arctica*

Rostr. On *Abies grandis* produced infection on *Salix scouleriana*. The aeciospores are thickened at one end. The aecial stage may occur on the same needles with *Pucciniastrum pustulatum*.—D. REDDICK.

154. Western New York Horticultural Society. Proposed prohibition of the importation of foreign nursery stock. Proc. West. New York Hort. Soc. 63: 115-117. 1918.—Discussion of U. S. Senate Bill No. 3344. Resolution (p. 120) adopted contains the following: "Whereas, there are now few diseases in Europe that have not been brought to the United States, and as only an imaginary line separates the United States from the Dominion of Canada and Mexico, from [sic, (to?)] which countries such plants and seeds may be brought; Resolved that the New York State Horticultural Society go on record as opposed to this bill."—D. REDDICK.

155. Whetzel, H. H., The Botrytis blight of golden seal. (Abstract.) Phytopath. 8: 75-76. 1918.—The disease is destructive to cultivated *Hydrastis canadensis* only in wet seasons. All parts of the host are affected. The organism, *Botrytis* sp., winters as minute clerogonia and as dormant mycelium in the dead petioles.—D. REDDICK.

156. Whetzel, H. H., Latest information on fruit diseases and their control. Proc. West. New York Hort. Soc. 63: 63-71. 1918.—Apple scab unusually severe. Average of results of growers' experiments in 11 orchards showed scab to be present as follows: untreated trees 54 per cent, sprayed trees 31.6 per cent, dusted trees 31 per cent. Black root-rot of apple, caused by species of *Xylaria*, is described and distribution noted. Yellow leaf of cherry (*Coccomyces* spp.) abundant but controlled by spraying or dusting. Peach brown rot (*Sclerotinia cinerea*) and scab (*Cladosporium carpophilum*) controlled by dusting. A fruit-gumming of plum, cause unknown, is described.—D. REDDICK.

157. Wilson, O. T., Notes upon a market disease of limes. Phytopath. 8: 45-50. Fig. 1-5. 1918.—A distinctly smooth spot with sharply elevated margin is the best macroscopic character. Diseased fruit has an abnormal odor. The interior tissue is occupied by a filamentous fungus. Repeated attempts to induce sporulation resulted in failure. Dried fragments of mycelium retain vitality and surface inoculations of healthy limes result in characteristic infection.—D. REDDICK.

159. Wolf, Frédéric A., and D. E. Stanford, A *Macrophoma* disease of figs. Phytopath. 8: 24-27. 1918.—Cankers on the larger limbs of *Ficus carica* in North Carolina, caused by *Macrophoma fici* Alm. & S. Cam. Pathogenicity proved by inoculation experiments.—D. REDDICK.

159. Wolf, F. A., Tobacco wildfire. North Carolina Agric. Extension Service Circ. 61. 4 p. 1918.—Popular account of a tobacco leaf-spot disease reported in full in Jour. Agric. Res. 12: 449-459. 1918.

160. Zimm, L. A., A wilt disease of maples. (Abstract.) Phytopath. 8: 80-81. 1918.—The disease is caused by a species of *Verticillium* but not *V. albo-atrum*. *Acer saccharum*, *A. rubrum* and *A. platanoides* were inoculated and typical wilt produced. The young shoots lost their leaves after several weeks and by the end of summer the twigs were dead. Mycelium was found in the tracheae of the wood and in the leaf petioles.—D. REDDICK.

PHARMACOGNOSY

HENRY KRAEMER, *Editor*

161. Mueller, N. R., The cultivation of *Hyoscyamus*. Jour. Amer. Pharm. Assoc. 7: 127-8. 1918.—A discussion of the results obtained from the cultivation of henbane, grown at the Pharmaceutical Exp. Sta., Department of Pharmacy, Univ. of Wisconsin. Directions are given for the selection of proper field for the cultivation of henbane, methods of planting seed, care of the growing plants and methods for collection of the drug. Chemical assays of the leaves of the second year's growth of biennial henbane showed a total of 0.07 per cent of alkaloids, while the leaves of the first year's growth grown from the same seed gave 0.067 per

cent. It is evident from these assays that the activity of the drug is about the same whether collected from the first or second year plant.—A. HOGSTAD, JR.

162. Holmes, E. M., Note on *Euonymus atropurpureus*. Pharm. Jour. 100:88. 1918.—A bark, rejected as not genuine root bark of *Euonymus atropurpureus*, consisted of about one part of genuine *Euonymus* bark and seven parts of a false bark. The false bark possesses numerous transverse scars, medullary rays three cells wide and large yellowish secretion cells. The transverse fracture does not show tangential striation of the liber nor the delicate gummy caoutchouc-like threads so characteristic of the true bark. Also the true bark is somewhat scaly externally, with slight longitudinal ridges and no transverse scars, and the medullary rays are but one cell wide. The false bark bears a resemblance to the bark of *Ptelea trifoliata* but the medullary ray cells of the latter bark are filled with sphaerapides, which do not occur in the medullary rays of the false *Euonymus*. This false bark is not identified. Criticism is made that the description of *Euonymus* bark in the British Pharmacopoeia is inadequate.—E. N. GATHERCOAL.

163. Youngken, H. W., Wafer ash as an adulterant for *Euonymus*. Amer. Jour. Pharm. 91: 160-165. 1918.—The two barks somewhat resemble each other but the fracture of wafer ash bark is short, the surface being pale yellow and waxy. The structure of each of the two barks is illustrated by microphotographs. The author was unable to note the bast fibers in *Euonymus* as described in the N. F.—A. HOGSTAD, JR.

164. Zufall, C. J., The histology of *Castela nicholsoni*. Jour. Amer. Pharm. Assoc. 7: 166-169. 1918.—This plant is a small shrub of the family Simarubaceae, found in the West Indies and Mexico. In American medicine and pharmacy it is generally known as *Chaparro amargoso* and is used chiefly in the treatment of amebic dysentery. The macro- and microscopical structures are fully described and illustrated.—O. A. FARWELL.

165. Sievers, A. F., Poisonous plants as sources of insecticides. Pharm. Era 51: My. 1918.—The author discusses the effectiveness, availability and supply of poisonous plants as sources of insecticides. Insecticides should meet the following general requirements; (1) efficiency, (2) harmlessness towards the material on which it is used, (3) cheapness, (4) ease of application. Some well recognized plant insecticides, such as extract of tobacco leaves, quassia and insect flowers, are limited to a very small field or to a small class of insects. The qualifications which a plant must possess in order to make its use in the form of an insecticide practicable are (1) effectiveness, (2) technique necessary to make the material applicable, (3) availability and supply. Effectiveness is determined first by laboratory tests involving the action of the powder direct or in sprays upon insects, then in the form of water extracts with or without the application of heat. Field tests are finally made. Some organic solvent is generally necessary in extracting the toxic material, and the question of expense is important. Water will not, as a rule, redissolve toxic extracts obtained by the use of organic solvents. A method is suggested whereby the toxic substances are brought into very concentrated solution in some suitable organic solvent and this concentrate then mixed with a large quantity of water, the procedure resulting in a fine precipitation, which, by shaking can be held in suspension while being applied as a spray. Plant material otherwise satisfactory as an insecticide must be available in large quantities in order to be of practical importance. Leaves and branches are more desirable than roots, for the former are more convenient, less expensive to collect and may be procured without material injury to the plant. The size and duration of the plant should also be taken into consideration in choosing material for collection. The practicability of cultivating a plant for insecticidal use depends upon (1) extent of area suitable for growing it; (2) labor required; (3) margin of profit.—H. W. YOUNGKEN.

166. Holm, T., *Cissampelos pareira* L. Merck's Rept. 27: 7-9, 60-61. 1918.—This is a vine of the Menispermaceae, widely dispersed in the tropics of both hemispheres. It is official in the Addendum of the British Pharmacopoeia as *cissampelos* in distinction from the root of *Chondrodendron tomentosum*, R. and P., which is also official as *pareira*. The use of the name *pareira* both as a specific name and as a pharmaceutical title, in addition to its local use as a vernacular name, has led to more or less confusion. Besides the two species mentioned

above there is a third of unknown origin (supposed to be a *Menispermum*) which produces drugs met with upon the American market under the name of *pareira brava*. *Cissampelos* has a long slender rhizome and very long roots. No macroscopical description of this drug is given, nor are characters pointed out by which it can be distinguished from the other closely related drugs, substitutes or adulterants. The distinguishing characters of the aerial parts and the histological structure of these, as well as of the drug, are fully described and figured.—O. A. FARWELL.

167. Zörnig, H., Simaruba bark of commerce. *Seperatabdruck aus den Verhandlungen der Schweizerischen Naturforschenden Gesellschaft 99. Jahresversammlung, (1917).*—There are three commercial grades of Simaruba bark in the drug markets; (1) Orinoco bark; (2) Maracaibo bark; and (3) Guiana (Dutch) bark. The latter goes entirely to Holland and is the same as the Orinoco form, which comes through Ciudad, Bolivia and is *Simaruba amara*, Aublet (*S. officinalis*, D. C.) The Maracaibo bark is different from the Orinoco bark both macro- and microscopically and does not come from any species of the genus *Simaruba*. A comparison of this bark with that of species of various other genera proves it to be derived from some species of the genus *Simaba*.—O. A. FARWELL.

168. van der Wielen, H., Pharmaceutical cinchona bark. *De Indische Mercur (through C. and D.)*; 90, 211. 1918.—Cinchona bark for pharmaceutical preparations should be valued, not on the quinine content alone, but on the total alkaloids, the nature of these and the kinds of acids present. *Cinchona succirubra* bark cultivated in Java has apparently deteriorated somewhat, but that from British India is less likely to have altered, and the total alkaloids from Indian *succirubra* bark have an especial antimalarial value. The proposal to utilize *Cinchona robusta* bark, of Java, in place of the *C. succirubra* bark should receive further careful consideration from the point of view of their relative therapeutic value and also as to the best method of making effective galenical preparations from them. *Succirubra* bark contains very little quinine but is rich in cinchonine and amorphous alkaloids while *robusta* bark is richer in quinine and especially so in cinchonidine.—E. N. GATHERCOAL.

169. Youngken, H. W., Pharmacognosy of aloes. *Pharm. Era* 51: 119-120, 122. 1918.—Full descriptions of the species yielding the commercial varieties are given. The histology of the leaves of these species is said to be identical and is fully described; also the various methods employed in collecting the juice and in producing therefrom the commercial varieties of aloes, the individual characters of each being enumerated and methods for distinguishing one from another rather fully dwelt upon.—H. W. YOUNGKEN.

170. [Anon.], Japanese insect flowers. *Chem. and Druggist* 90: 231. 1918 [Editorial].—The first plantations of insect-flowers were made in Japan in 1885 from seed of the genuine Dalmatian plant *Chrysanthemum cinerariaefolium*. Since the outbreak of the war, the industry in Japan has rapidly grown. The total exports in 1917 exceeded 30,000 cwt. The flowers are of the "open" or "half open" grade and are inferior to the former best Trieste grades.—E. N. GATHERCOAL.

171. Smith, H. G., Melaleuca resin. *Chem. and Druggist* 90: 14. 1918.—The outer bark of *Melaleuca uncinata* contains 23 per cent of resin, which is orange-brown, semi-transparent, very brittle, readily soluble in alcohol, ether-alcohol and acetone, but slightly soluble in chloroform and benzene and insoluble in turpentine, even at boiling. The chief constituent is resin acid, $C_{17}H_{28}O_4$, which melts at 148-150°C. and in alcoholic solution gives a deep-green color, precipitating with ferric chloride. A piece of the bark, ignited at one end will continue to burn like a candle until consumed.—E. N. GATHERCOAL.

172. Phillips, E. P., Buchu production in south Africa. *Chem. and Druggist* 90: 31-32. 1918.—The leaves of *Barosma betulina*, *B. crenulata*, *B. serratifolia* and other species of *Barosma* are considered. A discussion and comparison involving the botany of these leaves and their chemistry and medicinal uses; the manner of collecting and curing the leaves to form the drug buchu; adulterants, distillation and commercial distribution of the drug; exports and prices and a summary of the literature on the subject. Since the imposition, by the U. S. Government some years ago, of a tax on the gathered leaves the quantity exported

has markedly decreased (1912, 223,000 lbs.; 1916, 130,000 lbs.) and the price has increased (1909, 8 d. per lb.; 1916, 3 s. 3 d. per lb.). The advantage of cultivating the various species of *Barosma* yielding drug is presented, as also the collection of the leaves at the right season, the perfect curing of the drug, and the proper grading of consignments.—E. N. GATHERCOAL.

173. [Anon], Quinine wanted in Siam. Chem. and Druggist 90: 130. 1918. [Editorial].—Recorded deaths from fevers in Burma far exceed those from any other known cause, and malarial fever incapacitates many thousands for weeks and months. More than 10 million quinine tablets were made and sold in 1916 by the Burmese government; but recently the supply of quinine has become limited, new dies for the tablet machines are hard to obtain and even cartridge paper for wrapping the packages is unobtainable from India, so that the demand far outruns the supply. In addition, speculators buying government quinine and selling at great profit across the border in Siam have been reported. The demand for Siam is insistent and might profitably be met from Great Britain after the war is over.—E. N. GATHERCOAL.

174. Pool, R. J., A chart on general plant histology and physiology. Trans. Amer. Microsc. Soc. 37: 53-58. Pl. 6. 1918.—Emphasizes the use of a chart to express graphically to be ginners some interrelations between histology and physiology.—DUGGAR. (St. Louis).

PHYSIOLOGY

B. M. DUGGAR, *Editor*

175. Blackman, V. H., and S. C. Paine, Studies in the permeability of the pulvinus of *Mimosa pudica*. Ann. Bot. 32: 69-85. Fig. 1-5. 1918.—An excised pulvinus of *Mimosa pudica* immersed in warm water with the internal tissues exposed contracts on stimulation, indicating that the loss of turgor cannot be explained by a sudden increase of permeability of the tissues allowing a rapid exosmosis. The exosmosis of electrolytes was studied by the change of the electrical conductivity of the immersion water in a specially constructed conductivity cell, showing that contraction is associated with increased exosmosis. This increase is too small to account for the sudden loss of turgor, which is probably due to the disappearance or inactivation of a considerable part of the osmotic substances of the cells.—Experiments show that since the conductivity method is direct it is superior to the indirect plasmolytic method for the study of the effect of light on permeability. By use of the former it was shown that in the pulvinus the permeability of the cells for electrolytes is increased by exposure to light, but the stimulation rapidly decreases with time. A sudden change from light to darkness also increases permeability. Independent contractions of the pulvinus occurred at gradually decreasing intervals, so that, the time for the recovery becoming less and less, the contractions also decrease in extent, and the pulvinus at the end of the series remained in the contracted state.

Below 50°C. a slow rise of temperature has little effect on the rate of exosmosis. At higher temperatures increased permeability is probably due to lethal changes.—ZELLER (St. Louis).

176. McCall, A. G., and P. E. Richards, Mineral food requirements of the wheat plant at different stages of its development. Jour. Amer. Soc. Agron. 10: 127-134. Pl. 2-3; fig. 22-23. 1918.—Three stages in the development of the wheat plant are considered and thirty-six proportions of mono-potassium phosphate, calcium nitrate, and magnesium sulphate were used, in washed quartz sand in culture pots arranged on rotating tables with special irrigating devices. The results indicate that the most favorable proportions remain constant for the first two growth periods, each of thirty days; but for the final growth period—from 60 days old to maturity—the favorable proportions are materially changed. A relatively lower magnesium ratio is required at first.—DUGGAR (St. Louis).

177. Winslow, C. E. A., and I. S. Falk, Studies on salt action. I. Effects of calcium and sodium salts upon the viability of the colon bacillus in water. Proc. Soc. Exp. Biol. and Med. 15: 67-69. 1918.—A study of the viability curve, the results of which indicate that for

this bacillus the effects of these salts and their antagonistic influence yield data analogous to those obtained with higher organisms.—DUGGAR (St. Louis).

178. Wolkoff, M. I., Effect of ammonium sulfate in nutrient solution on the growth of soy beans in sand cultures. *Soil Science* 5: 123-150. *Fig. 1-7*. 1918.—Substituting ammonium sulfate for potassium nitrate in Tottingham's nutrient solution it was found that the former gave increased growth up to a certain limiting concentration. Growth in these experiments was measured by several criteria.—DUGGAR (St. Louis).

179. Hills, T. L., Influence of nitrates on nitrogen-assimilating bacteria. *Jour. Agric. Res.* 12: 183-230. 1918.—This paper considers the effects of nitrates on the growth of *Azotobacter* and their relation to pigment production and to the formation of volutin bodies; likewise the effects on the growth of *Bacillus radiclecola* in culture, and as influencing nodule development. The usual technique was followed and in general the results indicate that, while the growth of both organisms is promoted by nitrates in low concentration, *Azotobacter* responded more markedly to their presence and is more resistant to higher concentration. At the same time pigmentation of *Azotobacter* increases with concentration of the nitrate. Large amounts of any nutrient nitrate tested proved detrimental to the formation of nodules on alfalfa.—DUGGAR (St. Louis).

180. Burling, H. A., and M. Levine, Concentration of glucose and lactose and viability of coli-like bacteria. *Amer. Jour. Publ. Health* 8: 306-307. 1918.—Adding 0.5 per cent glucose to a medium consisting of 0.5 per cent peptone and 0.5 per cent di-potassium phosphate in distilled water, *Bacillus coli*-like organisms multiply rapidly during the first ten hours, but within 48-96 hours die off rapidly; whereas *B. aerogenes* and *B. cloacae* persist in undiminished numbers. Glucose of 0.3 per cent concentration is not injurious to *B. coli* in the same interval, while 1 per cent induces more rapid death. Lactose gives practically analogous results. The results show the necessity of reducing the concentration of lactose in preliminary enrichment media. An explanation may perhaps relate the phenomenon to change in hydrogen-ion concentration.—DUGGAR (St. Louis).

Kidd, F., Translocation in plant tissues. *New Phytol.* 17: 44-45. 1918.—The author questions the validity of the physical chemical concepts of Mangham in a paper on this subject (*Ann. Bot.* 31: 293-311. 1917).—DUGGAR (St. Louis).

181. Long, W. H., and R. M. Harsch, Pure cultures of wood-rotting fungi on artificial media. *Jour. Agric. Res.* 12: 33-82. 1918.—Many physiological cultural characters were studied by means of pure cultures of various wood-rotting fungi grown on agar prepared with vegetable decoctions derived from ten different sources. Extensive tables are given showing the influence of the substrate, of sunlight, and of other conditions on vegetative characters; likewise the effects of a variety of conditions on the character of sporophore formation; and throughout the whole there has been kept in mind various criteria which might be of value in the differentiation of the species and strains of organisms employed.—DUGGAR (St. Louis).

182. Bioletti, F. T., W. V. Cruess, and H. Davi, Changes in the chemical composition of grapes during ripening. *Univ. California Publ., Agric. Sci.* 3: 103-130. *Fig. 1-11*. 1918.—The composition of grapes was studied both during the period of growth and of ripening, and determinations were made of total solids and sugar, total and free acid, potassium tartrate (cream of tartar), and protein. While total sugar follows closely the total solids curve during ripening, the total and free acid decrease rapidly during ripening. In the early stages of growth, however, acidity increases due to an increase of free acid.—DUGGAR (St. Louis).

183. Dox, A. W., Amino acids and micro-organisms. *Iowa Acad. Sci., Proc.* 24: 539-545. 1917. [Distributed, 1918].—Collates the decomposition of amino acids as effected by yeasts and bacteria.—DUGGAR (St. Louis).

184. Hasselbring, H., Behavior of sweet potatoes in the ground. *Jour. Agric. Res.* 12: 9-17. 1918.—An investigation showing changes in water, sugar, and starch content of sweet potatoes during the latter part of the growing season whereby it appears that there is increased

water content practically coincident with the destruction of the leaves, whereas a constant total carbohydrate content is maintained, although there is a gradually decreasing starch and increasing cane sugar content during the latest stages examined—as under storage conditions, previously reported.—DUGGAR (St. Louis).

185. Allen, P. W., A simple method for the classification of bacteria as to diastase formation. Jour. Bact. 3: 15-17. 1918.—To standard agar is added 0.2 per cent of water soluble starch. After sterilization in the autoclave, Petri dishes are poured, hardened, and a streak inoculation with the organism is made. After a special incubation treatment, the culture is flooded with alcoholic iodine to determine if starch hydrolysis has occurred.—DUGGAR (St. Louis).

186. Corper, H. J., and H. C. Sweany, The enzymes of the tubercle bacillus. Jour. Bact. 3: 129-151. 1918.—Employing to some extent new methods, the authors report autolytic enzymes for both the human and bovine varieties of the tubercle bacillus. The bacilli or autolyzates possess trypsin-like, erepsin-like and pepsin-like enzymes, also a nuclease and urease, but they do not possess carbohydrate enzymes, so far as investigated, nor enzymes capable of digesting certain elastic tissues.—DUGGAR (St. Louis).

187. Falk, I. S., and C. E. A. Winslow, The effect of potassium bromate upon enzyme action. Jour. Biol. Chem. 23: 453-462. 1918.—It is found that potassium bromate, in concentrations of one part in 100,000-200,000, consistently stimulates the digestion of casein by trypsin *in vitro*. The casein-trypsin solutions were made by adding definite amounts of these substances to a mixture of dibasic and monobasic potassium phosphates with a P_k value 7.1. Considerably higher concentrations of the bromate are slightly inhibitive. A slight stimulative action of the bromate on the digestion of casein by pancreatin was also found.—DUGGAR (St. Louis).

188. Long, E. R., Further results on desiccation and respiration of Echinocactus. Bot. Gaz. 65: 354-358. Fig. 1. 1918.—An Echinocactus loaded with carbohydrate through desiccation for eight months in the open was placed in a dark chamber in order to follow catabolic changes and water balance. As anticipated, water was lost more uniformly in the dark chamber, but after 22.5 months one plant had lost 57 per cent of its original weight, 12 per cent while in darkness. Under the last mentioned condition soluble sugars disappear rapidly this disappearance being accompanied by the development of high acidity. At this stage the destruction of polysaccharids had scarcely begun, and the total hydrolyzable carbohydrate was hardly less than normal. Destruction of the latter does occur after confinement without photosynthesis for years, and this breaking up of stable substance in conjunction with resistance to desiccation explains the great viability of this plant in spite of prolonged starvation.—DUGGAR (St. Louis).

189. Child, C. M., Physiological senescence in Hydromedusae. Marine Biol. Bull. 34: 49-63. 1918.—In consideration of much recent work on plants as well as animals the author's findings are important in showing that with advancing development there are correlated certain progressive changes in behaviour and susceptibility, indicating a change of physiological state. It is concluded that a decrease in the rate of oxidation is a characteristic of these forms as well as of other animals previously studied.—DUGGAR (St. Louis).

190. Gerecke, W. F., Effects of rest and no-rest period upon growth of Solanum. Bot. Gaz. 65: 344-353. 1918.—Among the differences noted in the growth from the two series of potato tubers are these, (1) that the no-rest tubers produced one-stalked plants, (2) that these plants had a longer growing period than those from tubers given a normal rest, and (3) that recovered tubers of the no-rest series which were planted a second time exhibit a germination of several buds, these appearing above ground in about the same period as those from normal rest-period tubers.—DUGGAR (St. Louis).

191. Hodgson, R. W., An account of the mode of foliar abscission in citrus. Univ. California Publ., Bot. 6: 417-428. Fig. 1-3. 1918.—The mode of abscission conforms to the usual type. With regard to physiological phenomena, there is a well defined swelling and gelatini-

zation of the cell wall followed by dissolution through hydrolysis, all cells in the zone of abscission exhibiting swelling and gelatinization, but resuming cell division after separation, thus leading to the formation of clusters of clavate cells held by a portion of the gelatinized wall. Starch is stored in the abscission zone and later used in growth.—DUGGAR (St. Louis).

192. Le Goc, M. J., Effect of foreign pollination on *Cycas Rumphii*. Ann. Roy. Bot. Gard. Peradeniya 6: 187-194. Pl. 13. 1917.—Indications are given to the effect that, under the influence of germinating pollen from related genera, the ovules of *Cycas Rumphii* are stimulated to grow to normal size, but as they contain no embryos no true fertilization can have occurred.—DUGGAR (St. Louis).

193. Rigg, G. B., Growth of trees in sphagnum. Bot. Gaz. 65: 359-362. 1918.—Data have been accumulated in the Puget Sound and Alaska regions showing that various species of conifers exhibit a rate of growth in sphagnum which is only from 33 to 64 per cent of the rate in other habitats of the same region. No deciduous plants of the dimension of trees are found in sphagnum in that locality. Toxicity of the substratum is considered a chief factor in the inhibition of growth.—DUGGAR (St. Louis).

194. Sasscer, E. R., and A. D. Borden, Fumigation of ordinary greenhouse plants with hydrocyanic acid gas. U. S. Dept. Agric., Farmers' Bul. 880: 1-20. Fig. 1-4. 1918.—Gives extensive tables, showing resistance of host plants, as well as insect pests, to the gas.—DUGGAR (St. Louis).

195. Teague, O., The toxicity of Victoria blue 4-R for *Bacillus paratyphosus* A, *B. paratyphosus* B, and *B. enteritidis*. Jour. Bact. 3: 1-6. 1918.—*Bacillus paratyphosus* B exhibits differential sensitiveness to the toxicity of the dye mentioned.—DUGGAR (St. Louis).

196. Jörgensen, I., and W. Stiles, The electroculture of crops. Sci. Prog. 12: 609-621. 1918.—This is a very general review of the literature on this subject which reveals an ever-recurring cycle of experiments having as their object the proof or disproof that the electric discharge has a beneficial effect on vegetation, and which shows that the method of inquiry is fundamentally wrong due to a neglect of quantitative measurements of the discharge and a lack of knowledge of plant physiology. The advances made thus far have come from the physicist, but there is now a sounder outlook for this field through researches by those familiar with the physiology of plants.—ZELLER (St. Louis).

197. Shelford, V. E., Physiological problems in the life histories of animals with particular reference to their seasonal occurrence. Amer. Nat. 52: 129-154. 1918.—Although strictly an animal problem the data accumulated are of interest to the plant physiologist on account of the experimental work establishing the relation of seasonal variations to changing factors of the environment. In general the results indicate that explanations of variations are related to the sum of factor changes.—DUGGAR (St. Louis).

198. Weston, W. H., The development of *Thraustotheca*, a peculiar water-mould. Ann. Bot. 32: 155-173. Pl. 4-5; fig. 1-2. 1918.—A morphological paper indicating certain physiological aspects of reproduction such as (1) the influence of environment on the germination of sporangiospores and on gemmae formation, which represent merely a transient resting state induced by unfavorable environmental conditions, and (2) the influence of nutrition on the type of development from oospores.—ZELLER (St. Louis).

199. Bancroft, W. D., Outline of colloid chemistry. I-III. Jour. Franklin Inst. 185: 29-57, 199-230, 373-387. 1918.—A series of physical-chemical papers, fundamental in character, dealing with adsorption phenomena, catalytic action and the preparation of colloidal solutions.—DUGGAR (St. Louis).

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*

200. MacCaughey, V., Algae of the Hawaiian Archipelago. Bot. Gaz. 65: 42-57, 121-149. 1918.—The results of extended studies on the algal flora of the Hawaiian Islands, covering a period of ten years and extending to all the larger islands of the Archipelago, are given in the present paper. In part I, the author gives a brief review of previously published work, and then presents the results of his studies on certain ecological aspects of the subject. Particular attention is given to the relatively rich flora of the coral reefs on the islands of Kauai and Oahu, on the typical fringing types of which the author recognizes five distinct zones or areas of plant and animal life; characteristic species of the zones are given in nearly all cases. Rock-weeds, kelps, and laminarias, so conspicuous on colder coasts, are notably absent from the Hawaiian flora. Of particular interest are the coralline, or lime-secreting, algae on the reefs, especially abundant among these being representatives of Lithothamnion, Corallina, and Mastophora. The author reports the coralline forms from shallow waters as well as from waters of considerable depths, and regards them as undoubtedly contributing in a large degree to reef building. In the fresh water forms, particular attention is given to irrigated regions, ditches and flumes, mouths of volcanic caves, mountain streams, hot springs and thermal waters, summit bogs, and coastal brackish waters; representative species are listed for most of these habitats. No studies were made on the phytoplankton.

In striking contrast with the terrestrial flora, the algal flora of the islands, so far as the author can judge in the present incomplete state of knowledge, contains few endemic species, most of the forms being cosmopolitan or at least widely distributed in the tropics and subtropics. A list of probable endemic species is given. In part II the author lists practically all known species of Hawaiian algae, the list being based on his own observations as well as upon all available published records. Brief characterizations of the forms are given, as well as notes on distribution, habitat, and economic uses. No new species are described.—SCHRAMM.

201. White, J. W., Notes supplemental to the flora of Bristol. Jour. Bot. 56: 77-87. 1918.—Four species of *Nitella* and *Chara* are listed.—SCHRAMM.

202. Howe, R. H., A further note on the lichens of Nantucket. Rhodora 20: 40. 1918.

203. Harper, E. T., Two remarkable Discomycetes. Bull. Torr. Bot. Club 45: 77-86. Pl. 1-3. 1918.—*Underwoodia columnaris* Peck, described by Peck as stemless and everywhere acigerous, and placed by Schröter in the family Rhizinaceae, was collected several times by the author in Michigan. The specimens show the presence of a short stem, and, furthermore, naked strips extending upward for short distances into the hymenium. The author has rewritten Peck's description to include the newly-found characters. The species is regarded as representing a monotypic genus showing no close affinities with any known discomycete. The author also gives critical notes on *Pustularia gigantea* Rehm.—SCHRAMM.

204. Ichimura, T., A new poisonous mushroom. Bot. Gaz. 65: 109-110. Fig. 1-3. 1918.—A new species of *Clitocybe*, *C. acromelalga*, is described from a bamboo forest in Tsurugiji Noto, Japan.—SCHRAMM.

205. Stevens, F. L., Some meliolicolous parasites and commensals from Porto Rico. Bot. Gaz. 65: 227-249. Fig. 1-5, pl. 5-6. 1918.—Two new genera of the Moniliales—Isthmospora and Grallomyces—are described with *I. spinosa* as the type species of the former and *G. portoricensis* as the type species of the latter. In addition, there are described as parasitic on, or associated with, species of *Meliola*, the following new species: *Perisporium paulliniae*, *P. meliolae*, *Pseudonectria pipericola*, *Nectria meliolicola*, *N. portoricensis*, *Calonectria graminicola*, *Paranectria meliolicola*, *P. miconiae*, *Næmosphæra hyptidicola*, *Coniothyrium glabroides*, *Acremonium meliola*, *Arthrobotryum dieffenbachiae*, *A. glabroides*, *Helminthosporium glabroides*, *H. guareicum*, *H. ocoteae*, *H. moastomacearum*, *H. panici*, *H. parathesicolum*, *H. philodendri*, *H. helleri*, *Isthmospora glabra*, and *Fusarium meliolicolum*. *Arthrobotryum penicillium* appears as a new combination. Notes on a number of described species of

melioicolous parasites are given, together with an alphabetical list of the species of *Meliola* and the fungi found upon them.—SCHRAMM.

206. Zeller, S. M. and C. W. Dodge, Rhizopogon in North America. Ann. Missouri Bot. Gard. 5: 1-36. Pl. 1-3. 1918.—The following new species of Rhizopogon are described from North America: *R. maculatus*, *R. viridis*, *R. pannosus*, *R. diplophlæus*, *R. pachyphlæus*, *R. occidentalis*. *R. roseolus* appears as a new combination. Among the at present extra-limited species, *R. angustisepta* and *R. rubro corticeus* are described as new. Among excluded species *Hydnangium aurantium* appears as a new combination. Critical notes on described species are given, as well as a key to the North American species of the genus.—SCHRAMM.

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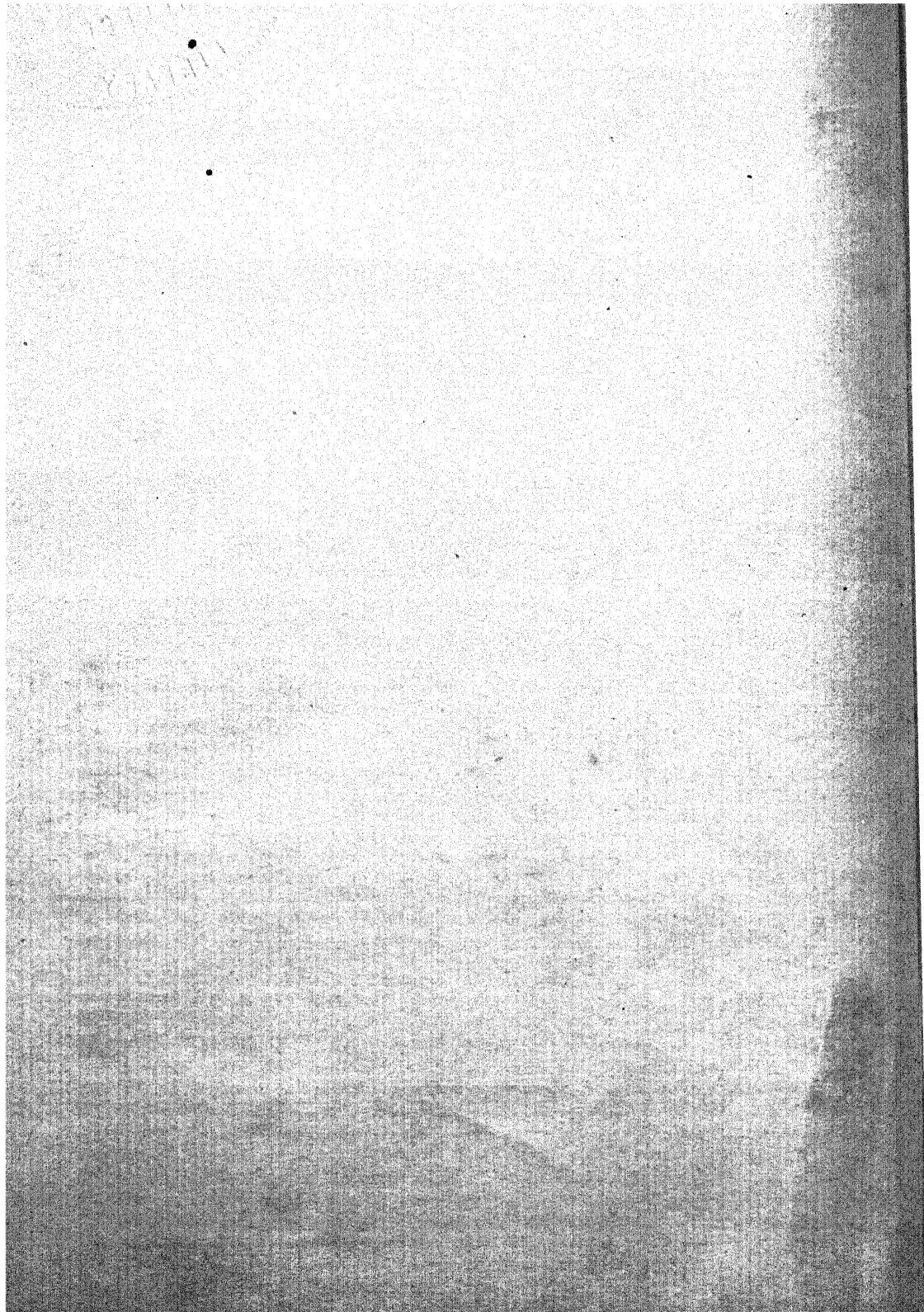
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Vol. I

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No. 2

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

207. Allard, H. A., Abnormalities in *Nicotiana*. Bot. Gaz. 65: 175-185. Feb., 1918.—Synanthry or coalescence of normally separate flowers appeared in plant of *N. alata* Link and Otto (*N. affinis* Moore). As these abnormalities are more or less hereditary, predisposing cause is associated with germ plasm.—Reviews previous work on catacorolla; cites evidence that in some cases this is hereditary. Catacorolla is often associated with mosaic disease in *N. tabacum*, while other species of tobacco, as *N. glauca*, *N. longiflora*, *N. silvestris*, and *N. alata*, also petunias and *Datura stramonium*, which are readily affected with this disease, rarely if ever develop such abnormalities.—Development of two growing points in young plants of F_1 between Maryland Mammoth and Yellow Pryor tobacco is mentioned. Tendency was noted in Maryland Mammoth to develop bifurcation of the main stem. This feature, however, usually appears rather late in development.—Variations in number of corolla lobes and stamens are cited and evidence is presented which shows that corolla lobes and stamen number are same in most instances.—H. K. HAYES.

208. Anthony, S. A., An anomaly of wheat anthers. Jour. Heredity 9: 166-168, 2 fig. Apr., 1918. Author cites anomaly of anthers of wheat grown in greenhouse of U. S. Department of Agriculture, differing from usual types of phyllody.—Only half of sporophyll is transformed, and not into leaf or petal, but into a process bearing stigma hairs. Author thinks abnormal physical factors in greenhouse may have had causative bearing.—HERBERT BEAUMONT.

209. Babcock, E. B., The rôle of factor mutations in evolution. Amer. Nat. 52: 116-128. Feb.-Mar., 1918.—Author refers particularly to work of Morgan and others upon *Drosophila ampelophila* as proof that factors undergo definite alteration, and holds that such alterations or "factor mutations" are sufficient to explain origin of all differences between varieties and races. Author points difficulties in attempting to account by factor mutations for origin of species which have different chromosome numbers. Those which have same chromosome number, but which differ from each other in many characters may readily have originated by factor mutation, by one of following methods: (a) One factor mutation may have manifold somatic effects, as in author's oak-like walnut and its parent, the California black walnut, but factor mutations which induce such extensive somatic changes seem to be exceedingly rare. (b) Simultaneous mutations may have occurred in several factors, but author regards this extremely doubtful. (c) Single factor mutations may have occurred in different individuals of a group, either simultaneously or successively, as evidenced by widespread existence of composite species. Factor mutations not adequate to account for origin of genera and phyla.—P. J. OLSON.

210. Babcock, Ernest Brown, and Roy Elwood Clausen, Genetics in relation to agriculture. 15 × 23 cm., xx + 675 p., 239 fig., 4 colored pl. McGraw-Hill Book Co, New York. Apr., 1918.—Test-book organized in three parts,—part 1 treating of fundamentals, embodying 286 pages in 14 chapters. Part 2, 155 pages, 12 chapters, shows application to art of plant breeding, and part 3, 170 pages, 13 chapters, devoted to their application in practices of animal breeding.—Deals chiefly with well established facts, distinguishing clearly what is known from unknown, points out problems awaiting solution and offers many helpful and practical suggestions for future work. No attempt is made to outline historical development of genetics or to interpret evolution, discussion of historical theories concerning these topics being entirely omitted. Genetics as applied to human race,—eugenics,—is also omitted. Includes working bibliography of literature, excellent glossary, and index complete and arranged in convenient form.—Part 1, fundamentals: after introduction defining science of genetics and its province, stating problems and methods and relation to other biological sciences, begins with consideration of variation, its relation to hereditary and environmental factors and its measurement. Helpful chapter on biometry gives latest and simplest methods for statistical studies. Chapter on physical basis of Mendelism is concise, clear and adequate, dealing merely with fundamentals necessary to understanding of cell behavior and Mendelian phenomena; details not essential to such understanding are not presented. Following chapters treat of independent Mendelian inheritance, linkage relations, nature and expression of Mendelian factors, allelomorphous relationships, factor interactions, factor relations in quantitative inheritance, inheritance of sex, and related phenomena, species hybridization, principles of pure line breeding, and mutations.—Part 2, plant breeding, gives definite directions and methods for improvement of plants through breeding. Considers materials, varieties in plants, and composition of population; discusses rôle of hybridization, and mutation; considers selection of germinal variations and production of new varieties from bud variations; and treats of graft-hybrids, chimeras, breeding disease-resistant plants, and one chapter is devoted to methods, giving specific instructions for planting, taking data, keeping records, conducting tests, etc.—Part 3, animal breeding, considers in similar way known cases of factor-inheritance in domestic animals and points out practical application of this knowledge to problems of animal breeding; treats general aspects of art of animal breeding, variation in domestic animals, discusses grounds against belief in inheritance of acquired characters, treats of hybridization, selection, disease in relation to breeding, determination of sex, fertility, and gives methods of breeding and of conducting breeding investigations.—E. E. BARKER.

211. Backhouse, W. O., The inheritance of glume length in *Triticum polonicum*. A case of zygotie inhibition. Jour. Genetics 7: 125-133. Feb., 1918.—*T. polonicum*, commonly known as Polish wheat, is distinguished from other wheat species by long glumes which, in extreme cases, attain length of 40 mm. while ordinary wheat has glume length which averages about 10 mm. *T. polonicum* crosses very readily with *T. durum* and *T. turgidum* and shows total lack of sterile individuals in F₂. Glume length is intermediate in F₁ and segregates in F₂ in ratio of 1 long : 2 intermediate : 1 short-glumed, but correct classification requires breeding test.—Author gives result of crosses between smooth-chaffed variety of *T. durum* known as Kubanka with average glume length of 12 mm. and variety of *T. polonicum* with average glume length of 29 mm., and intermediate pubescence. F₁ had intermediate glume length, averaging 18 mm., but was distinctly pubescent. In F₂ segregation into long-, intermediate- and short-glumed individuals was obtained and plants were classified as pubescent, intermediate or smooth. Short-glumed plants produced felted and smooth individuals in ratio 3 : 1. Large percentage of extremely long-glumed F₁ plants showed short velvety pubescence and several were absolutely smooth. Some of these smooth-chaffed individuals were bred following year and proved homozygous for smoothness. Test crosses of several of these smooth lines with Kubanka showed all smooth progeny in some cases and in other cases 3 rough to 1 smooth-glumed in the short-glumed segregates, although in these plants felting was of minor degree.

The author concludes that long glume inhibits expression of dominant character and that furthermore there was direct relation between length of glume and degree of felting.—In crosses between *T. polonicum* and felted, black-glumed variety of *T. turgidum*, closely related to Rivet wheat, similar results were obtained, F_1 being intermediate for glume length and felting and either white or faintly tinged. All fully colored plants which appeared in F_1 had short glumes except one plant with glume length of 16 mm. Evidence for short-glumed plants shows that color is independent of pubescence. Some of the pure lines were then crossed with Kubanka to determine whether they were homozygous for color. Two individuals of five thus tested produced all tinged individuals in F_1 , one all white, and two both white and tinged.—Crosses between Rivet and Polish wheat grown in north of Argentine and in England gave all colorless individuals, while in center of Argentine some short segregates were tinged.—Author concludes that combination of factors from Polish wheat and Rivet inhibits color, for this particular strain of *polonicum* crossed with colored varieties, other than Rivet, gives colored descendants, in climatic conditions under which, crossed with Rivet, they are colorless.—H. K. HAYES.

212. Bell, Alexander Graham, The duration of life and conditions associated with longevity. A study of the Hyde genealogy. P. 5-57. Genealogical Record Office. Washington, D.C., 1918.—Author selected Hyde Genealogy (published 1864) because it seemed to describe representative sample of the general population. Following data are tabulated: Age at death of propositus and parents; age of parents at birth of propositus; age of parents at marriage; number of years after marriage when propositus was born. Statistical analysis of these data which describe 8787 persons was made.—Of 2965 persons, whose ages at death were known, average term of life was 34.6 years, 35.2 per cent. of these died before 20 years of age; 7.3 per cent. lived to be over 80. Critical periods in lives were: first year of infancy and adolescence (about 23 years). Material showed heredity to be deeply involved in production of longevity, influence of father seeming somewhat greater than that of mother. What is really inherited is probably tough, wiry constitution, which makes attainment of old age extremely significant.—H. H. LAUGHLIN.

213. Belling, John, Lethal factors and sterility. Jour. Heredity 9: 161-165. Apr., 1918.—Classifies lethal factors into (a) those inhibiting development of zygote; (b) those which act on pollen grains and embryo sacs; (c) "Sublethal factors," not always fatal to the zygote or gamete which possesses them. Discusses results of presence of each type of lethal, giving mathematical formulae.—Lethal factors or factor combinations, acting on the pollen grains and embryo sacs (haploid generation) cause selective elimination of pollen grains and embryo sacs, resulting in partial sterility. In semi-sterility one half of gametes of both sexes fail to develop, due to presence of lethal factors or combinations. Examples in *Stizolobium* crosses and in *Oenothera Lamarckiana*. In former, fertile and semi-sterile plants occur in equal numbers, and in *Oe. Lamarckiana* only semi-sterile plants are produced, these being heterozygotes of an F_1 population.—Author recognizes several distinct causes for empty pollen grains (and aborted embryo sacs): (a) accidents of environment, not usually selective. (b) Inherited zygotic factors usually causing death of small fraction of pollen grains, not usually selective. All or nearly all of pollen may perish by action of zygotic factors, as in sweet peas with empty anthers, such abortion not being selective. (c) Lethal factors, acting on haploid generation causing semi-sterility. In this case elimination is selective, and F_2 ratios are altered. (d) Partial elimination of pollen grains or embryo sacs by sublethal factors. Two or more of these causes may be operative at same time on same plant.—J. L. COLLINS.

214. Boas, Helene M., The individuality of the bean pod as compared with that of the bean plant. Mem. Torrey Bot. Club 17: 207-209. June 10, 1918.—Concludes that pods of bean show individuality, represented by intra-locular correlation of about $r=.29$ in thickness—width index of their seeds.—J. A. HARRIS.

215. Butler, Arthur G., Ancestral characters in nestlings. *Avic. Mag.* 9: 211-213, 234-237. May-June, 1918.—When nestling differs much in color from parents author thinks it represents earlier stage in history of species, such color is usually more uniform and less brilliant. Adults resembling young represent more ancient type than those differentiated from young. Some males become differentiated by sexual selection. In thrushes males of *Merula merula* and *M. bouboul* differ from females; their hybrid males are less black than either species and with red-brown wing patch; their hybrid females differed, one paler than other, and close to *bouboul* female. Young *M. torquata* and *M. merula* hybrids had throat band varying in shape, but its color in both sexes resembled that of *torquata*.—J. P. KELLY.

216. Cobb, Frieda, and H. H. Bartlett, Purple bud sport on pale flowered lilac (*Syringa persica*). *Bot. Gaz.* 65: 560-562, 1 fig. June, 1918.—Description of purple bud sport on pale-flowered lilac. Sport occurred on summit of bush ten feet high which had flowered for ten years or more with only pale flowers. Differed from normal in spread of corolla and width of its lobes. In both measurement and color duplicated dark purple cultivated variety. Experiment outlined to test whether a reversion, somatic segregation or periclinal chimaere.—H. K. HAYES.

217. Cockerell, T. D. A., The story of the red sun-flower. *Amer. Mus. Jour.* 18: 38-47. 14 fig. Jan., 1918.—Popular account of sport of *Helianthus annuus* used in production of "red-flowered" sunflowers now somewhat widely cultivated as horticultural novelties. Single wild plant was found with carmine sap-pigment in addition to orange coloration common for species. These two pigments together gave rays conspicuous chestnut-red color. On account of self-sterility it was necessary to cross "sport" with plants having yellow flowers. Cross was made with plant having very pale yellow flowers. F_2 of this cross split up into four classes, one of which had flowers with carmine and pale yellow pigments and which were of wine-red color. Author points out that this particular type is to be expected on the theory of recombination of hereditary factors representing characters present in grandparents.—It is also reported that all annual species of *Helianthus* thus far tested, cross readily, but that F_1 generations are so nearly sterile that they can not be propagated as horticultural novelties. All inter-varietal crosses in *H. annuus* are reported to be fertile. Mention is made of 50 distinct variations in *H. annuus*; several of these are shown among the 14 illustrations. Three interspecific hybrids are mentioned and illustrated.—Special plea is made for more extensive and intensive study of variations and for their utilization in development of new horticultural forms. Sun-flowers illustrate most concretely results thus attainable.—A. B. STOUT.

218. Coulter, Merle C., Hybrid vigor. *Bot. Gaz.*, 66: 70-72. July, 1918. Consists largely of selected paragraphs on same subject from Coulter & Coulter's "Plant genetics," p. 169-176.

219. De Vries, Hugo, Mass mutations and twin hybrids of *Oenothera grandiflora* Ait. *Bot. Gaz.* 65: 377-422. May, 1918—New constant-breeding mutant, called *ochracea*, of *Oe. grandiflora*, occurred repeatedly in high percentage, suggesting mass mutations of Bartlett. Whereas crosses between *grandiflora* and a number of species yield twin hybrids that correspond to those produced by crossing *Lamarckiana* with the same species, crosses between mutation *ochracea* and same species yield uniform progeny. While *grandiflora* crossed with *Lamarckiana* gives triple hybrids (*ovata*, *lutea*, and *brunnea*), mutation *ochracea* crossed with *Lamarckiana* gives only *ovata* and *lutea*. Nature of *grandiflora* is conceived to be due to secondary mutation, producing typical and *ochracea* gametes in equal numbers. Typical species corresponds to 50 percent class in F_2 of Mendelian monohybrid case, mutation *ochracea* to one of the smaller classes, other smaller class being destroyed by lethal factor in close linkage with normal *grandiflora* gametes. *Lamarckiana* does not by itself produce twin hybrids because of second lethal factor closely linked with *laeta* in its gametes. Triple hybrids from *grandiflora* \times *Lamarckiana* are derived thus: *brunnea* from typical *grandiflora* \times *velutina* gamete of *Lamarckiana*; *lutea* from *ochracea* \times *velutina*; *ovata* from (typical *grandiflora* + *ochracea*) \times *laeta* of *Lamarckiana*. Triple hybrids are constant in that none of them splits off either of the others, but secondary differences occur.—A. F. SHULL.

220. East, E. M., Amer. Nat. 52: 366-368. June-July, 1918.—Review of Babcock and Clausen's "Genetics in relation to agriculture."

221. Freeman, G. F., Producing bread making wheats for warm climates. Jour. Heredity 9: 211-226. May-June, 1918.—Study of inheritance of seed texture through four generations is given. Crosses studied were made between white macaroni wheat (No. 1), soft red bread wheat (No. 3) and soft white wheat (No. 35). Difference in texture of translucent macaroni seeds and opaque seeds of soft wheats lies in proportion of gluten to starch and their behavior in ripening. Thin sections of seeds were made without changing their physical character by grinding and polishing in a manner similar to that used by petrologists in making sections of minerals. Transmitted light causes opaque portions of soft seeds to stand out as these portions are due to air spaces.—Crossed seeds were intermediate in texture. Seeds of F_1 plants (F_2 endosperm) ranged from soft to translucent hard without exhibiting definite classes. Pure hard- and pure soft-seeded plants were obtained in F_2 endosperm, and bred true in following generation. Plants with large proportion of one extreme produced seeds ranging toward that extreme.—Results were explained by use of two factors for increasing percentage of starch. Factors are cumulative in effect, each in homozygous condition giving greater result than when heterozygous. Table shows theoretical genetic classes and actual results in close agreement.—"Yellow berry" in wheat shows opaque spots with definite margins rather than diffuse opaqueness.—Genetic factors have not been fully analyzed but are evidently distinct from those which give rise to true softness. Percentage of "yellow berry" in pure lines of hard wheat is inherited. This character, however, is very sensitive to environment.—CARL KURTZWEIL.

222. Goodale, H. D., Inheritance of winter egg production. Science 47: 542-543. May 31, 1918.—A Cornish male was mated simultaneously to (a) Rhode Island Red hens from high fecundity families (mean winter egg production 52.5) and (b) to Cornish females (mean winter egg production 8.47). Cross A gave 33 pullets with mean winter production of 49.2. Cross B gave 11 pullets with mean winter production of 11.6. Author concludes that high-producing hens are able to transmit high fecundity directly to daughters; and that the characteristic is not sex-linked in Rhode Island Reds. Result of Cross A is said to be opposed to results obtained by Pearl in matings between Cornish male and Barred Plymouth Rock females.—Author presents on basis of his results a theory of inheritance of egg-production alternative to Pearl's. He assumes that this character depends on two factors that follow usual Mendelian scheme. Difficulties in this interpretation as well as in that of Pearl are mentioned and briefly discussed.—P. B. HADLEY.

223. Harland, S. C., On the genetics of crinkled dwarf rogues in Sea Island cotton. West Indian Bull. 16: 353-355. 1918.—Continuation of previously published report on crossing of Sea Island cotton by a crinkled dwarf "rogue." Sixty-eight F_2 families were grown from F_2 plants of Sea Island type; 46 of these families were mixtures of Sea Island and rogues, giving total of 731 Sea Island plants and 240 rogues; 22 families, having total of 571 individuals, were uniformly Sea Island. Three families derived from rogues gave total of 98 plants,—all rogues. Genetic difference between Sea Island and rogue is therefore inherited in simple Mendelian fashion and this indicates how Sea Island may be purified of this type of rogues. A peculiar rogue reported upon in first paper, which assumed Sea Island characteristics in later stages, gave 39 Sea Island to 16 rogue offspring in F_2 . Author considered it of ordinary heterozygous type.—J. P. KELLY.

224. Hays, Frank A., The influence of excessive sexual activity of male rabbits. II. On the nature of their offspring. Jour. Exp. Zool. 25: 571-613. Apr., 1918.—Offspring were obtained from 1st, 5th, 10th, 15th, and 20th services, in series of service taking place in rapid succession. Weight, head length, breadth between iliac extremes (measurements taken at 5-day intervals from birth to 90 days), and rate of mortality indicate that offspring from various service-types are not significantly different; hence author concluded excessive sex-activity has no effect on vigor of offspring. Sex ratio shows striking decrease of males from advanced services in series.—J. A. DETLEFSEN.

225. Herrman, Charles, Heredity and disease. *Jour. Heredity* 9: 77-80. Feb., 1918.—Author reports family of 6 children who die of pulmonary disease in early infancy; second family of 5 children, heart disease, same type. Physicians over-estimate virulence of infection, underestimate susceptibility of individual. Family histories should be made part of physicians' case histories. Author shows pedigree of amaurotic family idiocy, mongolian imbecility, and polydactylism. Inadequate family history study illustrated by example: Child showed sporadic cretinism; mother denied similar family affections; further questioning found father's two sisters operated on for goitre; patient's 16 year-old brother weighed 225 pounds; all indicating family disturbance of thyroid gland and endocrine system.—H. H. LAUGHLIN.

226. Huntington, George S., Modern problems of evolution, variation, and inheritance in the anatomical part of the medical curriculum. *Anat. Rec.* 14: 359-445. June, 1918.

227. Jennings, H. S., Disproof of a certain type of theories of crossing over between chromosomes. *Amer. Nat.* 52: 247-261. Apr.-May, 1918.—Mathematical investigation of type of hypothesis that supposes results of crossing over to be due to specific frequencies of exchange between individual members of pairs of genes, rather than to such relations between maternal and paternal groups of genes as are postulated on chiasmatype hypothesis. Formulae are deduced for calculating maximum and minimum frequencies of exchange mathematically possible with given percentages of crossing over. It is then shown that results possible on this view are hopelessly at variance with those actually observed in *Drosophila*. Jennings points out that this constitutes disproof of the simple specific frequency of exchange hypothesis, which must either be discarded, or be bolstered up with accessory hypotheses that will make it approximate to the chiasmatype hypothesis.—A. H. STURTEVANT.

228. Jones, Donald F., Bearing of heterosis upon double fertilization. *Bot. Gaz.* 65: 324-333. Apr., 1918.—Reviews work of Collins and Kempton and presents further data to show immediate effect on size of seed in maize due to cross pollination. Heterozygous and selfed seeds on same ears compared. Types crossed by Jones previously selfed 3 to 6 generations. Reciprocal crosses made. All plants of each line descended from some individual in previous generation. The strains used had yellow or white endosperm. Heterozygous seeds in resulting ears were distributed at random and clearly distinguishable. Twenty-four ears with both selfed and crossed seeds obtained. Average increase in weight of crossed seeds was 5 to 35 per cent.—Opposes suggestion of Némec that endosperm hybridization is an adaptation resulting in alteration of food supply to accord with properties of hybrid embryo. Also opposes Coulter and Chamberlain who regard various fusions as stimulus to growth.—Hypothesis again advanced that heterosis is not due to an indefinite physiological stimulus but is result of bringing together of maximum number of growth factors showing partial dominance. Shriveled condition of wheat hybrid seed probably due to favorable aggregation of growth factors for first generation of hybrid plant but not to the hybrid endosperm.—CARL KURTZWELL.

229. King, Helen Dean, Studies on inbreeding. I. The effects in inbreeding on the growth and variability in the body weight of the albino rat. *Jour. Exp. Zool.* 26: 1-54. May, 1918.—Inbreeding for fifteen generations resulted in no decrease in weight of body, inbred females being about equal in weight to controls, males heavier than controls. Decrease in weight during part of the series was due to malnutrition, since it occurred also in controls. Males were heavier than females. Variability of weight is greatest before age of two months in both sexes. Males and females were about equally variable before age of two months; after that age males were more variable than females. Both sexes of inbred rats were more variable than controls early in life, less variable later. Variability decreased in successive inbred generations, but not as rapidly as presumable approach to homozygosis.—A. F. SHULL.

230. King, H. D., Studies on inbreeding. II. The effects of inbreeding on the fertility and on the constitutional vigor of the albino rat. Jour. Exp. Zool. 26: 335-378. 2 fig., pl. 5, 1918.—Two series of albino rats carried through 25 generations brother and sister mating including altogether 25,452 individuals, total of 3,308 litters. Extreme litter sizes 1 and 17. First litter usually smallest, second litter largest, third and fourth smaller than second. Litter size depends chiefly on age, not on relatedness of parents. Entire inbred series averaged 7.5 young per litter,—stock 6.7. Sterility not increased by inbreeding. Partial sterility occurred in apparently healthy females found due to diseased condition of reproductive organs. Constitutional vigor apparently not impaired to any extent by inbreeding. Two kinds of malformations, taillessness and eyelessness, occurred rarely and appeared not to be heritable. Increased longevity shown by inbred compared to stock rats. Females longer lived than males and less susceptible to disease at all ages. Behavior tests showed inbred rats slower, less active, more timid and nervous and somewhat more savage than outbred animals. High fecundity, early sexual maturity and vigorous growth correlated. Superiority of inbred animals of one series to animals of other series in fertility, earliness of sexual maturity, and longevity considered due to segregation of genetic factors. Conclusion: result of inbreeding depends on character of stock inbred, selection and environment.—D. F. JONES.

231. Lancefield, D. E., Three mutations in previously known loci. Amer. Nat. 52: 264-269. Apr.-May, 1918—Author reports recurrence of two well known sex-linked mutants of *Drosophila melanogaster*, namely, white eye-color and rudimentary wings, and also appearance of seventh mutant allelomorph of white, namely, "coral" (w^c), which is the darkest mutant member of this series, being as dark as dark "bloods" without showing light fluctuations of "blood."—C. B. BRIDGES.

232. La Rue, Carl D., and H. H. Bartlett, An analysis of the changes involved in a case of progressive mutation. Genetics 3: 207-224. 1 fig. May, 1918—Authors present data as to length and width of leaves, length of capsules, number of ovules, length of spiral tracheids and of fiber tracheids of the capsules, and length of fiber tracheids of wood at base of stems, in *Oenothera Reynoldsii*, and its three mutational derivatives, *semialta*, *debilis* and *bilonga*. They conclude that increase and reduction in size of entire plant and of organs in this series of mutations involve only number and arrangement of cells, not at all size of cells. Increase in number of cells is taken as criterion of progressive mutation, decrease as representing retrogressive mutation. Mut. *bilonga* is characterized by remarkably long capsules (42-73 mm.). Number of ovules (933-1347 in *bilonga*) is approximately proportional to length of capsule, *Oe. Reynoldsii* having 647-857 ovules in capsules 30-45 mm. long. Percentage of sterility is about same in both forms. In Mut. *semialta* and mut. *debilis* capsules are shorter than in parent species, number of ovules about same, but percentage sterility considerably increased (from 36 percent in *Reynoldsii* to 75 percent in *semialta* and 85 percent in *debilis*). Authors correlate degree of sterility inversely with degree of vegetative vigor (nutrition).—Wood elements from stems of mutation crosses among above-mentioned types showed no differences from those of parental types; this was to be expected as all parents were alike in this regard. One plant of cross mut. *debilis* \times mut. *semialta* gave a bimodal curve of length of wood tracheids. It is suggested that possibly this plant was a chimera.

233. Lillie, Ralph S., Heredity from the physico-chemical point of view. Biol. Bull. 34: 65-90. Feb., 1918—Attempts to analyze into simplest physico-chemical terms the power of specific construction—of structural and chemical synthesis—which is common to all forms of living matter.—The problem of heredity is not to be dealt with by itself, but is identical with most fundamental problem of general physiology, how living protoplasm is synthesized from non-living matter.—Process of specific creative synthesis which lies at bottom of heredity inherent in life process in all of its forms.—Most fundamental property of living matter is power of proliferation at expense of materials and energy taken in from outside. Biologists must, therefore, seek for some general structural or physico-chemical peculiarity of living organisms which enables their substance to build up substance of generally similar kind.—Broadly considered, distinction between growth and reproduction is ill-defined. Physio-

logically both are in many essential features same. Proliferation which leads to growth and proliferation which leads to reproduction with the associated phenomena called inheritance, are, therefore, only artificially distinguishable in organisms as a whole.

Author presents thoughtful discussion of various physico-chemical problems which must be solved to fulfill above ends. Among subjects considered are specific character of proteins of different species. Physiologically corresponding or homologous proteins are more nearly alike the more nearly related the species from which they are isolated. Thus there is a general parallelism between degree of chemical relationship exhibited by homologous proteins and degree of biological relationship of the species from which they are derived. The marked physiological difference in a large number of pairs of stereo-isomers is taken as clear proof that activity of living protoplasm is largely conditioned upon specific space relations of atoms composing the physiologically active molecules. This is particularly true of compounds entering into metabolism. It is suggested that specific constructive metabolism is determined by stereo-structure. Specific non-living organizations found in electro-syntheses are discussed, and it is suggested that in certain regards structure-forming processes in living and non-living systems, otherwise not altogether similar, show significant parallelisms.—In higher organisms special mechanisms of heredity coördination and control have been superimposed upon elementary physico-chemical mechanism which conditions the fundamental proliferative activity. For example, chromosomes may control the detailed character of developmental proliferation.—J. A. HARRIS.

234. Nuttall, J. S. W., A note on the inheritance of colour in one breed of pigeons—An attempt to demonstrate a Mendelian type of transmission. *Jour. Genetics* 7: 119-124. Feb., 1918.—Report of unfinished experiments on "Racing Pigeons." Finds (1) red (*R*) of red chequer or mealy dominant to blue (*r*), (2) presence of chequering (*C*) dominant to its absence (*c*). No mention of previous authors.—L. J. COLE.

235. Orton, W. A., Breeding for disease resistance in plants. *Amer. Jour. Bot.* 5: 279-283. June, 1918. Brief review of what has been accomplished by breeding for disease resistance. Importance of intercontinental relation in problems of plant diseases pointed out. Nature has been breeding disease resistant plants since the world began. Work of breeder is largely to isolate these forms in plants economically desirable. Elimination of old non-resistant stock important.—History of control by breeding of asparagus rust, cotton wilt, cowpea wilt and root-knot. Favorable results obtained with watermelon wilt, cabbage yellows, tomato wilt, flax wilt and root-rot of tobacco also briefly outlined.—R. J. GARBER.

236. Payne, Fernandus, An experiment to test the nature of the variations on which selection acts. *Indiana University Studies* 5 (No. 36): 3-45. Mar., 1918.—Selection increased number of bristles on scutellum of *Drosophila ampelophila*. Increase was not gradual, but indicated series of mutations. Return selection was not effective. Two factors for extra bristles were located, one near zero end of X-chromosome, other in third chromosome. Evidence supports multiple factor interpretation.—E. ROBERTS.

237. Putnam, Eben, Tracing your ancestors. *Jour. Heredity*, 9: 8-14. Jan., 1918.—Author urges study of ancestors and gives valuable suggestions as to sources of information and methods of recording. Genealogy should be more than collection of names and dates, and should not be limited to male line, as traits do not follow accident of name.—H. H. LAUGHLIN.

238. Redfield, C. L., Some eminent men. *N. Amer. Jour. Homeopathy*, p. 1-7. June, 1918.—Author cites eminent men to prove relationship between quality of child and age of parent at its birth. Franklin was born when his father was 51; H. W. Beecher, Washington, Lord Kelvin, James Watt, when their fathers were 38; Audubon, when his father was 57; John and Charles Wesley, when their father was 40 and 43 years of age, respectively; Confucius, when his father was 71, Humboldt, when his father was 49. Author emphasizes that such fathers got education first and children afterward; deems anti-Lamarckian opinions unworthy of consideration.—J. P. KELLY.

239. Riddle, Oscar, Further observations on the relative size and form of the right and left testes of pigeons in health and disease and as influenced by heredity. *Anat. Record* 14: 283-334. May, 1918.—In healthy adult doves and pigeons right testis is usually larger, but shorter and thicker, than left. In hybrids these relations are reversed in an increased proportion of cases, reversal being more frequent in generic than in specific hybrids. Reversal makes a male bird more like female, in which left is always larger (or only) gonad. Other work had shown that hybridizing increased the number of males. Author suggests that reversed males are those forced, by crossing, to develop from female-producing eggs.—A. F. SHULL.

240. Riddle, Oscar, A demonstration of the origin of two pairs of female identical twins from ova of high storage metabolism. *Jour. Exp. Zool.* 26: 227-254. July 5, 1918.—Author reports two instances in ring dove in which identical female twins arose from a single ovum, and states that each ovum was characterized by "high storage metabolism" ["low (oxidizing) metabolism"]. These eggs were clearly shown not to be double-yolked eggs, and were considerably (24.9 and 43.1 per cent., respectively) larger than the other members of the pair. Both twin-producing yolks were second of the clutch. In addition it is stated that both cases occurred (1) in reproductively over-worked females, (2) in periods of continuous activity, (3) in very short intervals—since the previous clutch, and (4) that such crowded reproduction tends to produce an excess of females.—Author wonders if formation of identical twins was due to causal nexus between extraordinary size of yolks and unusual separation of blastomeres.—Author sketches view according to which size of yolk might influence disposition of segmentation spheres at animal pole, according to which identical twins should arise from extremely large and extremely small eggs of a species, females arising from former and males from latter, according to author's earlier view. Cases reported support this view, although one must await finding of identical males arising from extremely small eggs.—P. B. HADLEY.

241. Schultz, Adolf H., Studies in the sex-ratio in man. *Biol. Bull.* 34: 257-275. April, 1918.—Tertiary or adult sex-ratio for each continent shows slight excess of males, except in Europe. In Europe, female excess grows with advancing age. Greater male mortality and emigration are two potent causes. Secondary or birth sex-ratio shows slight but consistent excess of males. Primary sex-ratio (at time of fertilization) cannot be determined directly, but statistics on still-births and abortions indicate about 10 percent excess of males in primary sex-ratio for there is an excess of males in both cases. Review of literature on supposed causes of deviation from equality of two sexes in primary and secondary sex-ratio appended.—J. A. DETLEFSEN.

242. Sinha, S., Polydactylism and tooth color. *Jour. Heredity*, 9: 96. Feb., 1918.—Writer cites recurrence of extra thumb in two successive generations, in first generation only once among 11 sibs, in second generation once among 5 sibs. Shows lack of usual typical dominance of this character. In another family recurrence of brown (vs. white) teeth recorded in three successive generations in matings with normal white.—H. H. LAUGHLIN.

243. Stout, A. B., Fertility in *Cichorium intybus*: Self-compatibility and self-incompatibility among the offspring of self-fertile lines of descent. *Jour. Genetics* 7: 71-103. Feb., 1918.—Study of seed production in progenies of self-fertile plants of chicory, especially third generation descendants of three self-sterile parents. Over 500 offspring of two original crosses between unimproved cultivated chicory and one wild white-flowered plant tested as to self-fertility. Sterility due to physiological incompatibilities, not to anatomical incompatibilities. Tables giving percentage fertilities of different series show them to be exceedingly fluctuating. Self-sterile plants occur in all series. No very decided family differences apparent. Offspring of parents with self-fertility above 30 percent show somewhat higher percentage of self-fertility than offspring of parents of lower percentage self-fertility (Table VIII). Differences in vegetative vigor and total flower production not correlated with self-fertility.—Author concluded self-incompatibility and self-compatibility in chicory are

not to be described as dominant and recessive characters, or paired allelomorphs, and that there is no simple Mendelian formula that fits results. Factors effecting or prohibiting fertilization are "highly variable as to degree, specificity and transmission in heredity."—HELENE M. BOAS.

244. Sturtevant, A. H., *Science* 47: 641-621. June 28, 1918. Review of Babcock and Clausen's "Genetics in relation to agriculture."

245. Sumner, F. B., Continuous and discontinuous variations and their inheritance in *Peromyscus*. II. *Amer. Nat.* 52: 290-300. June-July, 1918.—Geographical races of *Peromyscus* reared in confinement exhibited in general differences (color, length of ear, tail, and foot, width of tail-stripes) which distinguished them in nature, showing that differences were not caused by environment. Differences in tail length and tail-stripe, among animals of same race, are shown to be inherited (coefficients of heredity about + 0.30). Crosses between certain of these races yielded F_1 and F_2 both intermediate, on the average, with F_2 only slightly or not at all more variable than F_1 .—A. F. SHULL.

246. Thomson, J. Arthur, *Scientia* 23: 391-393. 1918. French review of J. P. Lott's "Evolution by means of hybridization."

247. Weinstein, Alexander, Coincidence of crossing over in *Drosophila melanogaster* (*ampelophila*). *Genetics* 3: 135-172. March, 1918.—In *Drosophila* crossing over in one region of a chromosome prevents second crossover within considerable distance along chromosome from first crossover. This "interference" progressively decreases as distance from point of initial crossing over increases. Weinstein's work on X chromosome shows that when crossover has occurred in region between eosin and ruby a coincident crossover in region as far from first as that between sable and forked is as likely to occur as though the doubles were distributed according to chance alone. (Coincidence, = 1.025). With a greater interval a slight interference reappears (Coincidence 0.8572). With a still greater interval this interference rises still higher (Coincidence 0.7221). Some data presented in case of second chromosome indicate that similar relation obtains there also.—Statistical significance of these data is difficult to determine accurately. If this secondary drop in coincidence is real, then important basis for closer definition of mechanism of crossing over has been established. All known facts of coincidence, including this secondary fall, are in accord with view that chromosomes are loosely twisted and that there is definite tendency to form internodes of particular length. In case crossing over is due primarily to tension of tightly twisted strands, then an additional condition must be sought to explain this secondary drop.—Triple crossing over with formula for calculating coincidence of such cases, and maximum and minimum values for coincidence are discussed. Three new sex-linked mutations and one already known appeared.—CALVIN B. BRIDGES.

248. White, Orland E., Environment, variation and the laws of heredity. Brooklyn Bot. Gard. Leaflets 6 (No. 2): 1-16. 9 fig. Apr. 17, 1918.—Except for few verbal changes this semi-popular discussion duplicates previous "Leaflet" by author on same subject (Brooklyn Bot. Gard. Leaflets 4 (No. 2): 1-12. June 28, 1916).—R. J. GARBER.

249. White, O. E., Breeding new castor beans. *Jour. Heredity* 9: 195-200. 3 fig. May-June, 1918.—Author briefly mentions botanical relationship of castor bean (*Ricinus communis*); its hundreds of distinct varieties, with variation in size, oil content, and yield; where grown, and future possibilities in United States, owing to war and aeroplane uses. To make castor oil bean growing permanent industry, new varieties must be obtained by breeding, which will possess highest possible oil content, smallest amount of objectionable "acid," adaptability to waste and sandy lands, close, compact fruiting spikes with thin-walled, spineless, "non-popping" seed capsules, productiveness, earliness and long bearing season. These characters exist among innumerable forms and simply need to be brought together into one or more commercial varieties.—Little breeding work has been done with castor beans. They

are excellent material to work with, easily grown, comparatively free from diseases, produce seeds viable for many years and of high germination, and fertile F_1 and F_2 hybrids, even in most extreme crosses. Among characters showing Mendelian behavior are stem, foliage, and seed coat color, glaucous or non-glaucous plants, "popping" (dehiscent), or "non-popping" seed capsules, types of seed coat mottling, seed size and shape, height of plant, compactness and size of fruiting spike, time of maturity, certain leaf characters, etc. Few of these characters have been sufficiently studied to be placed on factorial basis.—Technique of crossing and selfing is given. Cross-fertilization probably does not exceed 5 percent. This small amount of crossing was accounted for by abundance of pollen, comparative proximity of female to male flowers, and sheltering effect of foliage against air currents carrying foreign pollen. As flowers of castor beans are said to be excellent honey producers author thinks greater cross-fertilization might be expected where bees are common.—RICHARD WELLINGTON.

250. White, Orland E., Inheritance studies in *Pisum*. III. The inheritance of height in peas. Mem. Torrey Bot. Club, 17: 316-322. June 10, 1918.—Author studied height of over two hundred varieties and found problem more complex than heretofore considered. Divides tall (over 4.5 feet) varieties into three distinct groups. Crosses between these types and tall give, F_1 and F_2 , all tall, but of different types. Large numbers of internodes usually dominant over smaller number. Believes each tall type represents distinct mutation. Half-dwarfs separated into two generic types (1) long internodes, few in number, (2) short internodes, more numerous. These give F_2 approximately 9:3:3:1.—True dwarfs (6 inches to 3.5 feet) possess 8 to 20 short internodes. Crosses with various types of tall, F_1 always consists of tall with long internodes, although many internodes may not in all cases dominate over few. F_2 generation of tall \times dwarf consists of 4 classes; tall with long internodes, half-dwarfs with either long or short internodes, and true dwarfs, and approximates 9:3:3:1 ratio. This is probably cross made by Mendel.—Author believes previous ideas of inheritance of height in peas have been based upon difference of internode length alone, all short-internode varieties being classified as dwarfs and all long internodes as tall. These in F_2 give 3:1.

Crosses between half-dwarfs with long internodes, and true dwarfs, gave half-dwarfs in F_1 and approximately 3 half-dwarfs (long internodes) and 1 dwarf (short internodes) in F_2 .—Author explains above data by presence and absence of five generic factors for height, two of which determine internode length and three the difference in number of internodes.—C. E. MYERS.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*.

[Unsigned abstracts are by the editor.]

251. Leopold, Aldo, Forestry and game conservation. Jour. Forestry 16:404-411. Apr., 1918.—It is pointed out that foresters so far have materially failed to recognize game production as part of their work in connection with handling the forest according to the best practice. This has been due to the dual authority over the game, the lack of a game administration demand, and a possible fear of the interference of game with silviculture. That the work should be handled by foresters is only a natural outcome of the situation as they know conditions, game, and are on the ground with a training which fits them for the work.—Game conservation is compared with silviculture when the various practices of raising, cutting and marketing game are shown to be analogous to silvicultural practices of handling timber lands. So far no forestry method has been applied to the game and destruction of the stand as in the original forests has been the rule. A plea is made for a rational policy in handling the game situation which would add a great deal to the recreational value of the forests.—E. N. MUNNS.

252. Baker, F. S., Aspen reproduction and management. Jour. Forest. 16: 389-398. Apr., 1918.—Studies of the aspen (*Populus tremuloides*) in the great Basin region have been made to determine the characteristics of seed and vegetative reproduction. Cuttings were made in the spring, in summer and in fall, during these seasons and in even aged stands of 70, 90 and 110 years.—So far, no aspen seedlings have been found in the region, connection to some underground stem of a previous stand always having been found. In five years observations, only in 1917 were any pistillate flowers found and practically all were sterile. Staminate flowers appear every season, but the bulk of the pollen—65 percent of 36 catkins—is infertile. The time of seed production is also associated with dry weather so that germination would be unlikely.—The vegetative production is of great vigor and persistence, and of 5417 sprouts on a clear cut area, 83 percent were root suckers, 9 percent were from old sprout groups, 7 percent were from the root collar, and 1 percent from the stump. Cuttings made in the fall sprout the next spring, those made in the summer do likewise, and those made in the spring may sprout the same year, but the maximum occur in the following season. Spring cutting results in the greatest number of sprouts per unit area, fall cutting the least, while the height growth has been but little affected by the season, the diversity of the stand being of greater importance. Age of the parent stands have little effect on the vigor or size of the sprouts. But if sprouts are taken off before there is sufficient plant food stored up in the roots for the next set of sprouts, the stand is soon exhausted, and may in the successive years destroy the stand entirely. In virgin stands, sprouts occur occasionally in openings and it is found that the heavier this shade the greater the number of sprouts, but also the fewer number that survive.

It was found that sheep damage to the sprout reproduction was proportional to the closeness of the grazing, and three successive years grazing destroyed the stand. Cattle seldom damaged the reproduction except when the area was overgrazed. Bark eating mammals working under a snow cover damage the sprouts considerably at times.—Aspen handled under a clear-cutting system with a coppice regeneration is simple and rotations of under 90 years are indicated. Sheep should be excluded for three years after cutting to insure successful reproduction though moderate cattle grazing may be permitted. A system of brush disposal to prevent sheep doing much damage to the sprout may be possible.—E. N. MUNNS.

253. Bates, C. G., Concerning site. Jour. Forestry 16: 383-388. Apr., 1918.—“The only final criterion of site quality is the current annual cubic foot increment of a fully stocked stand of the species under consideration.” The “only final criterion” is defined later as the “only satisfactory” one since quality production also should be taken into consideration. This he believes will be obtained under forest management. There is still the question of density and strength of the material in relation to site but complete knowledge is not likely to cause deviation from quantity standard. By “current annual increment” the author understands the growth for a ten-year period which is relatively close to the normal.—The author proposes changing the present system of designation from the Roman to the Arabic, making subdivisions of 30 cubic feet and expressing the site in groups as; 1a, or 1b representing a growth of from 10 to 20 cubic feet per acre, and from 20 to 30; etc.—Height is said to be controlled solely by soil moisture and there is a definite gradient in sap density from the roots to the tree top to maintain the osmotic water transfer at a definite rate. Height growth ceases when the minimum gradient commensurate with the demands of the tree and the maximum density which can be tolerated by the protoplasm of the topmost cells have been reached.—Height relations are taken to be purely moisture relations with height as an index of the density of the soil solution, height alone not summing up all the factors which the forester expresses in “site quality.”—EDW. N. MUNNS.

254. Bhola, Mathura P., Germination of *Cupressus torulosa* seed. Indian Forester 44: 175-176. Apr., 1918.—Reports experiments conducted at Pauri during the monsoon rains of 1917. Seeds were sown in pots early in July after being treated in various ways, the pots kept in the open. Seed sown in the nursery gave similar results to the potted seed. Seed

sown in August of the preceding year did not germinate until October. Lowest percentage of germination was obtained when seed was immersed in boiling water for three minutes, while best was obtained without any special treatment. Mixing the seed with manure caused germination in two days less time than when planted without treatment or with simple soaking for 24 hours. The best practice appears to be sowing without previous treatment and just after the break of the monsoon rains, in order to take advantage of the wet weather.—E. N. MUNNS.

255. Campbell, W. B., The fuel value of wood. *Canad. Forest. Jour.* 14: 1632-1633. Apr., 1918.—“An authoritative guide for the wood user, giving accurate data on fuel values.” The author goes into the mechanics of fuel combustion and explains the need of air-dry wood, and why woods differ in their heat values. Equal weights of wood, though of different kinds have the same calorific value. A pound of coal has from 12,000 to 13,000 British thermal units, while a pounds of perfectly dry wood has 8,220 British thermal units. The weight of a cord of wood multiplied by 8220; minus the weight of the water contained in the cord, multiplied by 720 gives the heating value of the cord of wood which may be compared with the heating value of the ton of coal worked out in the same way. A table shows the number of cords of wood required to equal a ton of coal, for 17 species. It is pointed out that as the coal contains a large amount of ash, it may reduce the calorific value of a pound of coal to 10,000 British thermal units and so increase the relative value of the wood.—E. N. MUNNS.

256. Marsden, E., Method of working bamboos. *Indian Forester* 44: 147-166. Apr., 1918.—Reports managements studies with *Dendrocalamus strictus* carried on in plots laid out in 1910. Different treatments were tried out, as to frequency of cutting, proportion of new shoots removed, and height of cutting. Cutting annually, whether taking all or part of the stand, or the manner of cutting, show decreased vigor and size in the culms, which averaged 17.7 feet in length and 2.4 inches in diameter. With a rotation of two years, the lengths averaged from 20 to 24 feet, the diameters from 2.5 to 3 inches, the height of cutting having no effect. Where the cutting removed all the culms except new shoots, both lengths and diameters were less than when only half the culms were removed. With the 3-year rotation, the clumps gave much better results, producing more, larger, and longer culms per clump, with a marked increase in the size and number. With a 4-year rotation, the length and diameters average smaller and the number of culms per clump is unchanged.

Other features brought out are: that heavy rains may or may not increase height and diameter growth, that cutting below the ground level has nothing to commend it, and that a rotation of more than 4 years would result in drying up the culm entirely. The topmost internode usually becomes dry in one year, while the rest of the culm stays green for 1 to 3 years. Cutting all the culms from one part of a clump has a tendency to kill that part of the clump, and the removal of all culms except the new ones causes the new shoot to become bent because of lack of support. Cutting should be deferred till as late in the season as practicable, to avoid bending the tender new shoots. Lignification takes place after the shoots are 9 to 10 months old, and when they are 18 months old they are difficult to distinguish from those 30 months old.—Author concludes that some culms must be left standing and that a 2-year rotation leaving half the old culms may be much better than a 3-year rotation taking all the old culms. A system may be based on the size of the clump and the number of new shoots produced, but there is much variation. A modification of the minimum diameter limit may be found to give the best basis for a system.—E. N. MUNNS.

257. Munns, E. N., Relative frost resistance of Eucalyptus in Southern California. *Jour. Forest.* 16: 412-428. 1918.—An unusually cold season was experienced in Southern California in January, 1913, when temperature dropped to 15° in the San Bernardino Valley. The effect of the low temperature on 26 species of *Eucalyptus* was studied on trees of different ages and origin. A description is given of the effect of this freeze, the damage done and the manner of recovery for each species studied and a table lists the species in groups as to their frost-hardiness. Nursery stock is exceedingly liable to damage, but smudging in the lath house prevents much damage.—E. N. MUNNS.

258. Osmaston, B. B., Rate of growth of bamboos. *Indian Forester* 44: 52-58. Feb., 1918.—For 4 months measurements were made on culms of the giant bamboo at Dehra Dun, India, twice a day, or at shorter intervals when the effect of temperature, rainfall, or sunshine was under consideration. It appears that the culms develop towards the end of the rainy season, completing the height growth about 8 weeks after the end of this period. Night growth usually was double that of the day and the author thinks that this has no special relation to the daily periodicity of light and temperature, as the greatest growth occurred during periods of highest humidity. With sunshine comes higher temperature which, unless it is raining, reacts on growth adversely, as the evaporation from the culm reduces turgescence. Under suitable humidity conditions (i.e., during a long continued drizzle) the rate of growth during the day was the same as that during the night, for a 4-hour period. The maximum growth during 24 hours was 13 inches. Tables of growth and charts of temperatures and rainfall at Dehra Dun, for the period under discussion are included.—E. N. MUNNS.

259. Puran, Singh, A preliminary work on the management of wood-tar. *Indian Forester* 44: 141-147. Apr., 1918. Analyses show tar made in India from *Pinus longifolia* has the same general characteristics as imported wood tar as to color, odor, consistency and solubility, but differs slightly in specific gravity and the percentage of light oil and pitch. The percentage of heavy oil is practically the same as the imported tar. From the work so far carried on the author believes that local industry can be developed to furnish the Indian market with a satisfactory wood tar. The kiln method will not be possible owing to the small percentage of tar in the wood, and a form of a portable retort must be devised. The charcoal remaining has very little market value.—E. N. MUNNS.

260. Record, Samuel J., Intercellular canals in dicotyledonous wood. *Jour. Forest.* 16: 429-442. Apr., 1918.—In general, dicotyledonous woods with secretory canals confined to tropical or subtropical regions. Such canals occur normally in some large stems while in others arise pathologically from an injury. In some dicotyledonous woods these are either all axial or all radial unlike the conifers which have them in both planes where resin ducts occur normally. Traumatic vertical ducts often originate in these conifers (*Pinus*, *Picea*, *Larix*, *Pseudotsuga*) and in *Sequoia*, *Abies*, *Tsuga* and *Cedrus*. In dicotyledonous woods, traumatic radial canals may arise independently of the vertical ones, or both vertical and horizontal ducts may arise as a result of injury. The normal arrangement is in tangential series giving the effect of growth rings.—The cells surrounding these ducts are chiefly parenchymatous, with the limiting cells either thick or thin walled. The origin and development are not uniform being schizogenous, lysigenous or schezo-lysigenous depending on the species. The presence of radial ducts is a great help in identifying tropical woods varying in size and number according to the species. The width of the rays vary widely. When very narrow the presence of the duct causes an enlargement while in the wider rays the ducts have no effect. A single ray may contain as high as four ducts. In section the radial canal is circular or elliptical, the limiting cells being thick walled usually. Radial canals are usually associated with vertical ducts in the cortex and, may end blindly in the ray without reaching the pith—extend to the pith and unite with vertical ducts, or connect with vertical ducts in the wood.—Some woods contain secretory cavities instead of canals, the space being spherical in shape and non-musculaginous, though some muscilaginous cavities have been found.—A synopsis of the various families of the dicotyledons in which intercellular canals in wood have been observed lists Hamamelidaceae, Rosaceae, Leguminosae, Rutaceae, Simarubaceae, Burseraceae, Meliaceae, Anacardiaceae, Bombaceae, Dipterocarpaceae, Combretaceae, Myrtaceae, Araliaceae, Styracaceae, Boraginaceae, Compositae. Comments are made on the canals found in these families. A figure helps explain the text.—E. N. MUNNS.

261. Harper, Roland M., Changes in the forest area of New England in three centuries. *Jour. Forestry* 16: 442-453. Apr., 1918.—Originally the forested area of the New England States was at least 90 percent of the total, but with the increase in population the forests

were destroyed to furnish arable land. Agriculture appears to have reached a maximum about 1875 for the census figures show a decrease in the land being farmed, with a corresponding increase in wooded area. The development of transportation caused a heavy migration from this region to the much more fertile agricultural lands in the Ohio Valley, while manufacturing increased due to the abundance of cheap water power. Data derived from the census figures show the area of forests to have steadily decreased up to about 1850 and that since that time the area in woodland has been increasing; Maine with some 75 percent of her area in forest; New Hampshire, an increase in wooded area from 50 percent to 65 percent; and the other states from 30 to 40 percent, to over 40 percent. Data are shown graphically in a diagram.

The earliest use of wood was for domestic use, in the construction of the dwellings and general farm use, but later log-driving was developed and most material was exported. Later the use of wood for fuel developed to great proportions following the advent of the locomotive which was originally a wood-burner. Pulpwood products began to be important as coal was developed for transportation, being confined chiefly to the spruce forest region. The development of transportation was perhaps the biggest factor in the increase in forest area for lumber from other regions could compete easily with the domestic product, while coal could be brought in and burned in the cities much more economically than wood. How much further the forest area will increase is largely a matter of conjecture.—EDW. N. MUNNS.

262. Turner, H. C., Effect of planting method upon growth of western yellow pine. Jour. Forestry 16: 399-403. Apr., 1918.—Experiments on planting methods have been carried on at the Fort Bayard Nursery in the Southwest for several years, since 1912, plantations of western yellow pine being established by the "mound" and by the "side-hole" methods. In this work it was found that the "mound" method gave the highest percent of survival, and examinations show the average height growth of the 1912 plantings totaled 30.9 inches for the "mound" method against 26.2 inches for the "side-hole" planted trees. The average height growth in 1915 was 8.4 inches for the "mound" planted and 7.2 inches for the "side-hole," while in 1916 the respective growths were 9.5 and 8.3 inches. Plantations established in 1913 show the "mound" stock to be 16.35 inches while side-hole averaged 13.78 inches.

According to the author, the difference in the height growth is due to the manner of planting, distortion of the roots acting adversely upon height development. The "mound" method is acknowledged too expensive for general field planting, but a plea is made for more careful attention to the placing of the roots in reforestation. The separation and spreading of the roots as widely as possible is urged.—E. N. MUNNS.

263. Turner, Harry C., The effect of planting methods upon growth of western yellow pine. Jour. of Forestry 16: 399-404. 1918.—Experiments in planting the western yellow pine (*Pinus ponderosa*) in Arizona and New Mexico have been carried on for a number of years. Three methods have been tried; the "Side-hole," the "Middle-of-hole" and the "mound" method. After 3 years, it was found that with care in planting, all three measures gave equally good percentages of survival, though a slight difference was noted in favor of the "mound" method. The 4-year old plantations examined in 1915, when the trees had been planted by the "side-hole" and "mound" methods revealed that the average height of the former was 26.2 inches, and that of the latter was 30.9 inches, the growth in height for 1915 being 7.2 and 8.4 inches, respectively. The other area showed the average of 100 trees planted by the "mound" method to be 16.35 inches, while the average height of the trees planted by the "side-hole" method was 13.78 inches, a difference of 2.57 inches of four years, or 18.65 percent.—Examination of the roots planted by the "mound" method showed an equal development in all directions, while those planted "side-hole," showed a marked tendency to grow one-sided and away from the side of the hole against which they were placed. This root growth has always been a matter of attention in the nursery transplant beds, but up to the present appears not to have received sufficient attention.—E. N. MUNNS.

HORTICULTURE

W. H. CHANDLER, *Editor*.

[Unsigned abstracts are by the editor.]

264. Blake, M. A., Observations upon summer pruning of the apple and peach. *Proc. Amer. Soc. Hort. Sci.* 14: 14-23. (1917) 1918.—A preliminary report on some experiments with summer pruning started at the New Jersey Experiment Station in 1912. A rather complete review of the literature on summer pruning is given. The author's results indicate that summer pruning of the trees during the first summer after planting tends to reduce the total growth. From observations by practical growers, however, the author is of the opinion that early summer rubbing off of opening buds where branches are not desired may be desirable. While it tends to reduce the growth the first summer it makes unnecessary much pruning that would reduce the growth during the second summer. With older trees the effect of summer pinching back of the shoots was in nearly all cases to permit the pushing of buds that might ordinarily remain dormant. Sometimes when the pinching was done just before a dry period the buds did not push at once, but pushed as soon as there was favorable weather.—The author emphasizes the fact that it is the summer cutting or pinching back of new shoots and not thinning out the shoots that would be expected to influence the maturity of the wood. In his experience generally the effect of this pinching or cutting back was to delay maturity of the wood and fruit also by causing the late growth.

265. Heinicke, Arthur J., Factors influencing the abscission of flowers and partially developed fruits of the apple (*Pyrus Malus L.*) New York (Cornell) Agric. Exp. Sta. Bull. 393: 45-114, *figs.* 8. July, 1917.—Results of observations and experiments made during the three seasons 1914-1916, with a view of determining the factors influencing abscission of flowers and partially developed fruits of the apple during so-called "June drop." The literature of the subject is briefly surveyed and a bibliography is appended.—Studies concerning the magnitude of abscission, indicate that from two-fifths to four-fifths of the total number of flowers are lost during the early drop, or within 1 to 4 weeks after the petals fall, and that only 3 to 7 percent remain after the June drop. From one-sixth to one-third of the total number of flower bearing spurs finally retain fruits, the proportion varying with the variety, with trees of the same variety, and with different limbs of the same tree. The variations in the latter case were not due to the location of the limb, nor to the angle at which it grew, but it was found that a larger percentage of spurs set fruit on limbs that had produced a relatively light bloom than on those that had produced a full bloom, and that spurs on limbs with large leaves were more fruitful than those on limbs with small leaves.—During 1915, there was no consistent difference in fruitfulness between the spurs arising from 1913 wood and those arising from older wood, but as a rule, spurs arising from lateral buds on 1914 wood set comparatively few fruits in 1915. The spurs occurring near the end of the seasons' growth, or just before the zone of weak buds seemed to be most likely to set fruit.—The vigor of the individual spur was found to be an important factor in abscission, the strong spurs being more apt to retain fruits. As compared to weak spurs, the previous seasons' growth of vigorous spurs is longer, the new spur growth of cluster base is heavier, the bud leaves are more numerous, there are more flowers to the spur and the weight of the lateral growth is greater, all of which points to an abundance of reserve food in adjacent tissues. Furthermore, the diameter of the conducting cylinder on strong spurs is greater, and the leaves are larger than on weak spurs. It has been shown experimentally, that more water passes to strong buds than to weak buds, and that the size of the leaves is influenced by the amount of water available at the time of their expansion. It is believed, therefore, that the flowers and young fruits on weak spurs are handicapped not only by a small amount of reserve food but also by a limited amount of sap.—Experiments in which vigorous cluster bases were totally or partially defoliated show that the bud leaves are necessary as "sap pullers," and that a few leaves are just as good for this purpose as many leaves, so far as the set of fruit is concerned. Flower bearing spurs inclosed in translucent paper bags held more fruit than

those in opaque sacks.—The apples that fall in the early stages of their development have fewer seeds on the average than apples that remain on the tree, but some of the former lot have a relatively high seed content, and many of the latter lot have fewer seeds than the average. Spurs bearing fruit with a low seed value are heavier as a rule than spurs produced on the same limb but bearing fruits with a high seed value. This is shown to be due to the fact that on vigorous spurs, both poorly fertilized and well fertilized flowers develop into fruits; weak spurs, on the other hand retain only those fruits that have a high seed value, which usually means many good seeds.—The term "seed value" is based on a study of the interrelation of weight of fruit, number of seeds and vigor of the spur, and it emphasizes the importance of quality rather than number of seeds. This quality, which is manifested by the ability of the individual seeds to increase the weight of the fruit is associated with the size of the embryo, and it is thought to be the result of cross fertilization. Experiments are recorded which indicate that the seeds affect the osmotic properties of the apple, and in this way influence the movement of sap to and from the fruit. As a result of this influence they are often able to overcome the handicaps of poor conducting tissues and inadequate supply of reserve food, so that apples with many good seeds can develop even on weak spurs.—Experiments have shown that the abscission layer which brings about the loss of the apple is not formed so long as the sap passes into the fruit as it does under normal conditions, or away from it as is the case when the leaves draw sap from the apple; but abscission occurs when the movement of sap through the separation layer is inhibited while the spur is still living, e.g., when the fruit is removed from its stem, or when the transpiration is checked by coating the apple with vaseline, or by exposing the fruit and the spur to humid conditions.—The author concludes "that unfavorable conditions of nutrition and water supply are among the basic factors which cause the normal drop of flowers and partially developed fruits of the apple. All factors that have a direct or an indirect influence on nutrition and water supply of the individual flower and fruit, such as pollination, weather, cultivation, and the like, are of importance. Fruit development, however, is possible without cross-pollination and even under relatively unfavorable weather conditions, so long as the young fruit has an abundant supply of water and of readily available food."—A. J. H.

266. Oskamp, Joseph, The rôle of soil temperature in tree growth. *Proc. Amer. Soc. Hort. Sci.* 14: 118-126. (1917) 1918.—Report of some studies in soil temperature as influenced by cultural methods in an orchard and the possible bearing which the soil temperature may have on the results of the different cultural methods. The author gives a considerable account of his experience in securing soil temperature records. All thermometers requiring personal reading were found useless and misleading for the purpose in hand, and soil thermographs were therefore adopted.—Temperature records were kept in plots receiving clean cultivation during most of the summer with a rye cover crop; the depth of spring plowing being about 7 inches; plots in grass, the grass being cut and allowed to lie where it fell, when a mulch of a bale of wheat straw to the tree was added; plots with grass which was cut and allowed to lie where it fell; and plots with grass which was cut and raked up around the tree.—The cultural methods did not greatly influence soil temperatures at a depth of 9 inches. The greatest variation in temperature was between the plot with cultivation and the one with grass and wheat straw. These were the two plots, however, that gave the best growth. The author concludes, therefore, that soil temperature is not an important factor in determining the growth of the trees. The heavy mulch maintained the soil temperature a few degrees higher in winter and considerably lower in summer. During the summer months the highest temperature occurred about 10.00 p.m. and the lowest about 12 hours later.

267. Roberts, R. H., Winter injury to cherry blossom buds. *Proc. Amer. Sci. Hort. Sci.* 14: 105-110. (1917) 1918.—A preliminary report on the study of winter killing of the fruit buds of the sour cherry (*Prunus Cerasus*) in Wisconsin. The report gives the amount of killing during the winters of 1915-16 and 1916-17. The fruit buds were killed to a much larger extent on trees whose length growth during the previous season was smallest. On

any tree the larger percentage of buds was killed on the shorter twigs such as those on the lower portion of the tree. Of the spur buds, those on spurs of medium length were killed in largest percentage. The larger buds were killed worse than smaller ones. Buds on trees that had been defoliated by leaf spot were not killed as badly as those on normal trees. The author gives data to show that the killing is determined by the extent of differentiation at the time winter approaches. Defoliation by checking the differentiation left the bud in a hardy condition. Buds of the Early Richmond trees were killed worse than those of Montmorency. In both cases the old trees were killed worse than the younger. The differentiation was generally more advanced at the beginning of winter with the Early Richmond variety. In many cases not all of the flowers in the bud were killed.

268. Shaw J. K., An investigation of the interrelation of stock and scion in apples. Proc. Amer. Soc. Hort. Sci. 14: 59. 1917.—An outline of an investigation which has been under way at the Massachusetts Experiment Station for the past 5 years. It is designed to throw light on the effect on the bearing tree of the varying seedling stocks that commonly are used in growing fruit trees. Twenty-three named varieties of apples have been established on their own roots by means of a deep planted root graft, cutting off the seedling root after the scion has established a root system of its own. Varieties vary greatly in their ability to root from the scion. These own rooted trees have been budded to seventeen different varieties. There are included also trees budded on seedling roots by the ordinary nursery method.—The orchards included in this investigation comprise 1414 trees which have been set from one to three years.—The article includes a brief summary of experiences in securing the trees on their own roots and promises a full report as soon as these experiments are completed.—There seems to be differences in the size of the trees on different roots. A summary of the influences affecting the growth of the trees, omitting the factor of soil and age of the trees as they appear at present, seems as follows: (1) The vigor of the scion variety; (2) The rooting ability of the stock variety; (3) The vigor of the stock variety; (4) In certain cases the compatibility of the stock and scion.—J. K. S.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

269. Atkinson, G. F., Selected cycles in *Gymnoconia peckiana*. Amer. Jour. Bot. 5: 79-83. 1918.—Germination of the aecidiospores of *Caeoma nitens* was found to be "selective," the mode of germination being determined by temperature conditions. When four raspberry plants were kept chilled under bell jars by means of ice during the progress of inoculation (about 60 hours), teleutospores of *Gymnoconia peckiana* resulted in about 1 month on all the plants. The check plants (kept "close beside" the chilled ones under the bell jars) did not develop teleutospores. Earlier experiments by the author (in 1915) had shown that the aecidiospores of *Caeoma nitens* from the dewberry (*Rubus villosus*) would germinate on the surface of water with typical promycelia each bearing four basidiospores. He therefore suggests that the type of rust is dependent on temperature conditions; in the warmer regions south, the spores germinate as promycelia and a one-generation cycle results (*Caeoma nitens*); whereas in cooler regions (as well as in the intermediate regions during colder weather), the aecidiospores germinate by an ordinary long germ tube, and the two-generation cycle results, with the teleutospores of *Puccinia peckiana*.—E. W. OLIVE.

270. Bliss, Mary C., Interrelationships of the Taxineae. Bot. Gaz. 66: 54-60. 2 pl. 1918.—The author calls attention to the great divergence of opinion as to the systematic position of the Taxineae, presents evidence for the belief that they are the most modern group of conifers, and by a study of their anatomy throws light on the interrelationships of the three genera of the family. Resin parenchyma, a tissue normally present in all conifers which are without resin canals, was found abundantly in the wood of stem and root in *Cedrela latensis* but was much less abundant in *Torreya*. In *Taxus* it occurs in the root.

believed to be conservative. It is normally absent in the stem of this genus, but was found to occur here in wounded regions. The family is therefore regarded as a reduction series, with *Cephalotaxus* as its most ancient genus and *Taxus* as its most modern one.

271. Flint, Esther Margaret, Structure of wood in blueberry and huckleberry. Bot. Gaz. 65: 556-559. 2 pl. 1918.—The author has studied ray structure in the wood of *Vaccinium* and related genera (*Gaylussacia* and *Rhododendron*) and notes the occurrence of two types of rays, uniseriate and broad. The presence in the latter of two kinds of cells, one dark and rather small, the other light and somewhat larger, is cited as proof that these broad rays are compound structures which have originated by the aggregation of small rays and the transformation of fibers into parenchyma. This process the author believes to have been responsible for the formation of broad rays in *Quercus*, and she calls attention to the essential similarity in structure of the broad rays in these two groups of plants.

272. Kendall, John N., Abscission of flowers and fruits in the Solanaceae, with special reference to *Nicotiana*. Univ. of Cal. Publ., Bot. 5: 347-428. Pl. 49-53, 10 fig. 1918.—The work is an amplification of that of Goodspeed and Kendall on *Nicotiana* and an extension of the investigation to other species of the Solanaceae. Abscission is defined as the detaching of an organ by the separation of actively living cells at or near its base. Material from the genera *Nicotiana*, *Solanum*, *Cestrum*, *Lycopersicum*, *Petunia*, *Salpiglossis*, *Datura*, *Salpichrora*, and *Lycium* was studied. This included 4 species in which floral abscission never occurs, 4 in which it seldom occurs, and 21 which were examined microscopically to determine the structure of the separation zone and the method of abscission.—The study of the histology and cytology of the pedicel showed that the separation layer arises near the base except in *Lycopersicum* and *Solanum tuberosum* where it is near the middle or at the base of the most distal internode. The separation layer, a portion of the primary meristem which has retained some of its original activity and where cell walls with high water content, hence probably more readily subject to hydrolysis, are found, is preformed ready to function at any time. The internode may be assumed to be a metabolic gradient with the most active cells at the base. In all species, except *Datura*, the separation cells are characterized by their small size, which is not necessarily significant, their isodiametric shape, large amount of protoplasm and somewhat collenchymatous appearance but no chemical differences could be detected to differentiate these cell walls from those of the neighboring cells. The middle lamella near the base of the pedicel seemed somewhat more easily hydrolyzed by acids than in the more distal portions. The grooves near the separation zone in *Nicotiana* and *Lycopersicum* do not necessarily bear any relation to the abscission region. Mechanical tissue in most of the berry-forming species of the Solanaceae does not extend through the abscission zone but in the pedicel of *Nicotiana* it is developed and frequently holds the fruit to the plant in spite of the abscission of the cortex.—The process of abscission involves the separation of the cells along the middle lamella. No cell divisions or elongations were observed as accompanying abscission. All the cells across the separation layer, except the tracheae and cuticle which must be mechanically broken, take part in abscission. The number of cells involved varies in different species and under different external conditions. The actual separation is brought about by hydrolysis and consequent dissolution of the middle lamella and in part of the secondary cell membranes, probably due to the activity of an enzyme which must be extremely sensitive to slight changes in the environment and continually present in the separation zone of plants showing abscission, although it may suddenly cease to be active as for instance after the opening of the flower. An increase in turgor frequently occurs during abscission and probably serves merely to hasten and facilitate the process. Abscission of the style and corolla in *Nicotiana* and *Datura* resembles that of the flower.—The length of time between anthesis and normal flower-fall due to lack of fertilization differs among varieties of *Nicotiana*, ranging from 5 to 18 days. After pollination, 0.7 to 4 days only elapse between anthesis and corolla-fall, the stimulation of the stylar tissue tending to shorten the period of corolla-fall but having no appreciable effect on floral abscission. After 7 hours, shoots subjected to 1.5 percent of illuminating gas at 19°C. have shown abscission. The

actual time for cell separation is about 30 to 60 minutes. The reaction time for flower-fall due to mechanical injury depends on the age of the flower and the type of injury. Temperature is an important conditioning factor. Abscission is assumed to be directly induced by narcotic vapors, injury to floral organs, especially the ovary, sudden rise in temperature and lack of fertilization. Indirectly, changes in soil conditions and factors evident under normal physiological conditions, such as those causing the abscission of male flowers after anthesis, are effective. Abscission may be produced with illuminating gas in small isolated pieces of pedicel or in hand sections. It is thought to be largely independent of such processes as transpiration, a statement which is supported by experiments which show that abscission is not necessarily induced by checking transpiration from the flower. The author concludes that abscission is fundamentally a physiological problem, the crux of which lies in the bio-chemistry of the cells.—ELOISE GERRY.

273. Loeb, Jacques, Healthy and sick specimens of *Bryophyllum calycinum*. Bot. Gaz. 66: 69. 1918.—The author suggests that the plant of *Bryophyllum calycinum* described by Miss E. L. Braun (Bot. Gaz. 65: 191. 1918) which produced shoots and roots from leaf notches while the leaves were in connection with the plant, was a sick specimen.

274. Ludwig, C. A., and C. C. Rees, The structure of the uredinium in *Pucciniastrum Agrimoniae*. Amer. Jour. Bot. 5: 55-60. Pl. 8. 1918.—*Pucciniastrum Agrimoniae* is shown by the authors to have its urediniospores borne in chains, with each chain maturing and detaching only one spore, the terminal, at a time. This work therefore corrects the view presented in the North American Flora, wherein the spores are stated to be borne on pedicels. A new grouping of the Pucciniastratae is therefore suggested: the fern rusts, in which the urediniospores are borne on pedicels; to be separated from *Pucciniastrum*, *Melampsorella*, etc., in which the urediniospores are borne in chains.—The first peridial cells of *Pucciniastrum* are found to arise, as in the ordinary aecidium, by the transformation of the first-formed cells of the chains. No intercalary cells were formed, nor were any chains found having more than three or four spores.—E. W. OLIVE.

275. Record, Samuel J., Significance of resinous tracheids. Bot. Gaz. 66: 61-67. 5 fig. 1918.—The author discusses the occurrence of resinous tracheids in the gymnosperms. He presents evidence to show that they represent reservoirs for excretions from the living cells of the wood, and that the characteristic form of the resinous mass (usually a septum or plate) is taken in response to well known physical laws. He believes that the resin-like plates found in the tracheids and vessels of many angiosperms are essentially similar in their origin and significance to the resinous tracheids of gymnosperms.

276. Steil, W. N., Studies of some new cases of apogamy in ferns. Bull. Torrey Bot. Club 45: 93-108. Pl. 4-5. 1918.—This paper records the results of 6 years' investigation for the purpose of determining to what extent under normal cultural conditions apogamy occurs in the homosporous leptosporangiate ferns, especially the genera *Pellaea*, *Pteris* and *Aspidium*. The paper contains a summary of the literature of the subject, and adds a number of new species to the list of apogamous ferns. The most satisfactory culture medium was sphagnum saturated with a culture fluid, and kept under bell jars with proper aeration. The species in which apogamy is reported for the first time, are the following: *Pellaea atropurpurea* var. *cristata* Trelease, and *P. viridis* (Forsk.) Prantl.; *Pteris cretica* L. (several horticultural varieties); *Aspidium varium* (L.) Sw.; *A. auriculatum* (L.) Sw., and *A. caryotidium* Wallich; *Cyrtidium Fortunei* J. Sm.—In *Pellaea viridis* two embryos were found in a few cases, one apogamous, the other apparently developed from an egg.—The attempts to induce apogamy in *Nephrodium molle*, and *Asplenium nidus*, as recorded by Yamanouchi and Nagai, were unsuccessful. A similar failure to induce apogamy was experienced with *Osmunda regalis*.

The results of his investigations are summarized by Steil as follows: (1) The prothallia of a number of species of ferns in which apogamy was discovered were grown under cultural conditions favorable for the development of sex-organs and embryos in non-apogamous

species. (2) The prothallia of all the apogamous ferns become heart-shaped before the formation of the embryo. Antheridia are produced on the prothallia of all apogamous forms, but archegonia are formed on the prothallia of only a few forms. (3) The embryo usually appears as a compact region of cells posterior to the apical notch and on the ventral side of the prothallium. In a number of species tracheids are visible among the prothallial cells in the pale portion of the gametophyte. (4) First to make its appearance is the apical cell of the leaf, then that of the root, and later that of the stem. A foot has not so far been observed to develop in connection with the apogamous embryos. (5) Either root or leaf or both of these organs may develop on the dorsal side of the prothallium. As a rule, however, they are produced on the ventral side. (6) While the embryo is produced as a rule posterior to the apical notch, it may be formed on a cylindrical or conical "process" and in some instances on the lobes of the prothallium. (7) Several apogamous embryos may be formed on a single prothallium. (8) As in non-apogamous species, secondary prothallia are readily produced, and these form embryos like those of the ordinary prothallia. (9) The "light" area present on the prothallium of some of the apogamous species is rendered more conspicuous in cultures maintained in weak light. The conical or cylindrical "process" increases considerably in length when the prothallia are grown under these conditions. As a result of weak illumination, the embryo is frequently produced as a direct outgrowth of the apical region of the prothallium. (10) By growing the prothallia of *Osmunda regalis* in strong light and preventing fertilization for a year and a half, no embryos were produced apogamously. (11) An investigation extending over a period of 6 years has resulted in the discovery of apogamy in a large number of ferns. The conclusion that apogamy is of frequent occurrence in the genera *Pellaea*, *Peteris*, and *Aspidium*, is justified on the basis of the many cases so far found in these genera.—DOUGLAS H. CAMPBELL.

277. Steil, W. N., Method for staining antherozoid of fern. Bot. Gaz. 65: 562-563. 1 fig. 1918.—The author describes a method for the killing and staining of fern antherozoids by the use of osmic acid and safranin which has given excellent results. He describes briefly the structure of the antherozoids thus treated.—E. W. SINNOTT.

278. Steil, W. N., Bisporangiate cones of *Pinus montana*. Bot. Gaz. 66: 68. 1 fig. 1918.—The author notes the occurrence of a few bisporangiate cones on a specimen of *Pinus montana*. The microsporophylls were borne on the lower portion of the cones, the macrosporophylls on the upper. The sporophylls, sporangia and pollen were apparently normal.—E. W. SINNOTT.

PATHOLOGY

DONALD REDDICK, *Editor*.

[Unsigned abstracts are by the editor.]

279. Anderson, H. W., The bacterial shot hole of peach. Trans. Ill. Hort. Soc. 51: 121-128. (1917) 1918.—A description of the disease together with field observations under Illinois conditions. The control by the use of nitrogenous fertilizers and cultivation after the recommendations of Roberts in Bul. 543 U. S. Dept. of Agric. is suggested. Bacterial shot hole or black spot has caused serious damage in southern Illinois peach orchards during the last few years.—H. W. A.

280. Anderson, H. W., Notes on apple diseases in Illinois. Trans. Ill. Hort. Soc. 51: 413-419. (1917) 1918.—Special attention given to body diseases, especially various types of cankers, crown, and root rots. The death of many apple trees in Illinois is caused by agents other than plant pathogenes. The proper treatment of cankers of various types is discussed. Attention called to the seriousness of blister canker (*Nummularia*) and the New York apple tree canker (*Sphaeropsis malorum*) in Illinois orchards.—H. W. A.

281. Anonymous, Barberry eradication and rust control. Department of Agriculture and Labor of North Dakota, Special Circ. 4 p. 1 f. May 15, 1918.—Statement of relation of wheat rust and barberry with call for complete eradication of the latter.—E. S. REYNOLDS.
282. Anonymous, Plant quarantine legislation. *Phytopath.* 8: 170-172. 1918.—Text of a bill in Congress [U. S. A.] providing for exclusion of nursery stock from importation and a statement of the attitude of the Federal Horticultural Board to the project.
283. Appleman, Charles O., Special growth-promoting substances and correlation. *Science* 48: 319-320. 1918.—Growth-promoting substance is probably low in potatoes showing spindling sprout disease.—Suggests that the *Bryophyllum* plants reported on by Braun (*Bot. Gaz.* 65: 150-174. 1918) probably were unhealthy.
284. Arthur, J. C., Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. *Bot. Gaz.* 65: 460-474. 1918.—See No. 385.
285. Ball, E. D., Leaf burn of the potato and its relation to the potato leaf-hopper. *Science* 48: 194. 1918.—A leaf-burn of potato has been widely prevalent in Northern United States. The margins of the leaves turn brown and the dead areas gradually widen until the leaves die. In Wisconsin the extent of the injury was directly proportional to the number of leaf-hoppers (*Empoasca mali*) present. Typical leaf-burn was produced in four days in cage experiments with this insect.
286. Berger, E. W., Termite injury to sweet potatoes. Florida State Plant Bd. Quart. Bull. 2: 190-191. Fig. 89. 1918.—Comparison of the injury caused by termites with that caused by weevil, *Cylas formicarius*.
287. Bisby, G. R. and A. G. Tolaas, Copper sulphate as a disinfectant for potatoes. *Phytopath.* 8: 240-241. 1918.—A progress report showing that copper sulfate 3 pounds to 50 gallons of water is somewhat more effective for the control of black scurf (*Rhizoctonia*) of potatoes than either formaldehyde solution or mercuric chlorid as commonly employed.
288. Bolley, H. L., Control of diseases of farm crops. North Dakota Agric. Exp. Sta. Circ. 14: 1-4. 1918.—Concise directions for treatment of grain smuts, seed-born potato diseases and flaxwilt.—E. S. REYNOLDS.
289. Boyce, J. S., Perennial mycelium of *Gymnosporangium blasdaleanum*. *Phytopath.* 8: 161-162. 1918.—Evidence is presented to show that the mycelium of *Gymnosporangium blasdaleanum* is perennial in the wood of *Libocedrus decurrens* and may persist in the vegetative stage for more than 200 years. In addition to witches' brooms the fungus causes spindle-shaped swellings on branches and trunks. The swelling is the result of a decided increase in the development of wood with a negligible increase in the bast. The sapwood and light brown heartwood of the swelling are conspicuously marked with very small dark brown flecks in which mycelium occurs abundantly. No indication of telial sori can be found on the swellings.
290. Boyce, J. S., Imbedding and staining of diseased wood. *Phytopath.* 8: 432-436. 1918.—Technique for rapid preparation and differential staining of thin sections of dry wood of *Libocedrus decurrens* infected with *Gymnosporangium blasdaleanum*. Method doubtless applicable to other lignified tissues containing fungous mycelium.—Technique for infiltrating with gelatin wood of same host when reduced to a dry and friable condition by *Polyporus amarus*. A differential stain was not found.—A modified method of infiltrating such tissue with paraffin is also described.
291. Brown, J. G., Mistletoe vs. mistletoe. *Bot. Gaz.* 65: 193. f. 1. 1918.—*Phoradendron californicum*, a common parasite on *Parkinsonia*, *Prosopis* and *Acacia* was found near Tucson, Arizona, growing on *Phoradendron flavescens* as its host.—H. W. ANDERSON.

292. Bureau of Plant Industry, Plant disease survey. Plant Disease Bulletin 2: 1-18. Mar. 15, 1918.—A summary of the disease survey reports for the month.

293. Burkholder, Walter H., The production of an anthracnose-resistant white marrow bean. Phytopath. 8: 353-359. 1918.—By crossing Well's Red Kidney bean, a variety resistant to the two known biological forms of *Colletotrichum lindemuthianum*, with White Marrow, which is very susceptible to one strain, (F), a strain of the latter variety has been developed which is resistant to both forms of the pathogene. No inoculations were made on the F₁ hybrids, but inoculation experiments conducted on the F₂ generation gave a simple Mendelian ratio of 3:1. Resistance was found to be dominant. Besides the anthracnose resistant White Marrow developed from this cross, resistant strains of several commercial varieties of beans are being isolated. These are the White Kidney, the Vineless Marrow and the Red Marrow.—W. H. B.

294. Carpenter, C. W., Wilt diseases of okra and the Verticillium wilt problem. Jour. Agric. Res. 12: 529-646. Pl. A and 17-27. 1918.—The work was undertaken in order to test the theory that there are two similar wilt diseases of the okra induced by two different vascular parasites.—Numerous inoculations and cross inoculations show that *Verticillium albo-atrum* and *Fusarium vasinfectum* are each able to produce a wilt disease of the okra. These diseases can be differentiated only by isolating the causal organism.—In general the Fusarium wilt is more serious in the southern range of okra growing, while the Verticillium wilt is more serious in the northern range of this crop.—It is demonstrated for the first time that cotton may have both of these wilt diseases.—Physiological and morphological studies convince the writer that the genus *Acrostalagmus* must be united with the older genus *Verticillium*.—Proper rotation, selection of seed from healthy plants and disinfection of seed are recommended for the control of these diseases.—J. ROSENBAUM.

295. Carpenter, C. W., A new disease of the Irish potato. Phytopath. 8: 286-288. pl. 1. 1918.—The disease is caused by a mite, possibly of the group Tetranychidae. It is prevalent in all potato sections of the Hawaiian Islands. The young leaves become bronzed on the lower surface, they twist and curl on the longer axis, become abnormally hirsute and soon dry out and die. Spraying with lime-sulfur solution or dusting with sulfur is a specific.

296. Dalbey, Nora E., Phyllachora as the cause of a disease of corn and a general consideration of the genus Phyllachora. Trans. Ill. Acad. Sci. 10: 230-248. figs. 1-8. (1917) 1918.—A disease on corn in Porto Rico caused by a species of Phyllachora similar to *P. graminis* is described in detail. The question of the validity of the species of this genus as given by Saccardo in "Sylloge Fungorum" is discussed. A table is given illustrating the overlapping of spore measurements and the general confusion which exists in the classification of the genus, Phyllachora. A short bibliography is added.—H. W. ANDERSON.

297. Davis, J. J., Tilletia on wheat in North Dakota. Phytopath. 8: 247. 1918.—Brenckle's *Fungi Dakotenses* no. 132, is *Tilletia laevis* not *T. tritici*. No. 132a is correctly labeled, *T. tritici*.

298. Doidge, E. M., Potato diseases I: Early blight or leaf curl, *Macrosporium solani* E. & M. Union S. Afric. Dept. Agric. Bull. Local Series 26. 1918.

299. Doidge, E. M., Potato diseases II: Scab. *Actinomyces chromogenus* Gasp. South African Fruit Grower 4: 128. 1918.

300. Doidge, E. M., Potato diseases III: Corky or powdery scab, *Spongospora subterranea*. (Wallr). Johns. South African Fruit Grower 4: 153. 1918.

301. Duff, George H., Some factors affecting viability of the urediniospores of *Cronartium ribicola*. Phytopath. 8: 289-292. fig. 1. 1918.—Urediniospores of *C. ribicola* kept in a low temperature (2-5°C.) incubator were tested at intervals for viability. Germination

could not be induced after 12 weeks. Glass-filtered sunlight at temperatures below 20°C. stimulated germination. Exposure to an electric arc for about 1 hour at a distance of 40 cm. and at a temperature below 20°C. completely inhibited germination. Ultra-violet rays are thought to be responsible. In general the viability of urediniospores is found to be low.

302. Edgerton, C. W., Bean pod meal for culture media. *Phytopath.* 8: 445-446. 1918.—Pick the pods in season, cut into small pieces, dry to crispness with artificial heat. Grind to a fine meal and store in glass. Twenty grams of meal is sufficient for 1 l. of medium. Soak the meal 30 minutes in water at 50 to 60°C., filter and proceed as usual.—Tests with various organisms have shown identical growth on agar made from meal and from fresh pods.

303. Elliott, John A., Nematode injury to sweet potatoes. *Phytopath.* 8: 169. *f.* 1. 1918.—Nematodes found to the depth of 3 cm.

304. Federal Horticultural Board [U. S. A.], Service and regulatory announcements. November: 135-142. Jan. 7, 1918. December: 143-148. Feb. 13, 1918.

305. Federal Horticultural Board [U. S. A.], Quarterly letter of information No. 25. p. 23. Oct., 1917.—Continuation of news letter.

306. Fitzpatrick, H. M., The life history and parasitism of *Eocronartium muscicola*. *Phytopath.* 8: 197-218. *Pl. I., fig. 4.* 1918.—Examination of type specimens has demonstrated the identity of *Eocronartium typhuloides* Atk., *Typhula muscicola* Fr., and *Clavaria muscigena* Karsten. The new combination *Eocronartium muscicola* (Fries) is proposed.—The fungus is demonstrated to be an obligate parasite, a fact of interest in the light of its close relationship with the rust fungi. The mycelium is intracellular, and traverses all parts of the host, practically every cell being invaded. Diseased plants are normal in appearance, and invaded cells contain unaltered nuclei and cytoplasm. The mycelium is perennial, advancing each year into the embryonic tissue of the new branches. Attempts to grow the fungus on culture media failed. Although the spores germinate, and develop short germ tube growth soon ceases. Artificial inoculations were unsuccessful.—The other known cases of parasitism in the Auriculariaceae are discussed, and the suggestion is advanced that the Uredinales originated from auriculariaceous fungi parasitic on mosses.—H. M. F.

307. Fracker, S. B., Effect of crown gall on apple nursery stock. *Phytopath.* 8: 247. 1918.—The presence of crown gall or hairy root on apple nursery stock in Wisconsin causes a reduction in value of from 17 to 18 percent. Details are given in *Jour. Econ. Entom.* 11: 133-135. 1918.

308. Gilbert, W. W., and M. W. Gardner, Seed treatment control and overwintering of cucumber angular leaf-spot. *Phytopath.* 8: 229-233. 1918.—Epiphytotics of angular leaf-spot, caused by *Bacterium lachrymans*, may originate either from contaminated seed or from infested soil. Seed disinfection reduces the incidence of the disease nearly one-half. The use of treated or of disease-free seed in fields well removed from previous cucumber patches is recommended as a control measure. The seed is immersed in mercuric chlorid, 1-1000, for five minutes and is then washed with water for 15 minutes.

309. Gillespie, L. J., The growth of the potato scab organism at various hydrogen ion concentrations as related to the comparative freedom of acid soils from the potato scab. *Phytopath.* 8: 257-269. 1918.—Various strains of *Actinomyces chromogenus* of known pathogenicity were tested for their tolerance of acid in culture media adjusted to various hydrogen ion exponents. Two of the media were synthetic, designated as citrate and succinate; the third was made with potato broth and is designated as potato-tartrate. Methods of preparation and standardization are explained fully. The organism grew well in a neutral medium but made practically no growth at a hydrogen ion concentration represented by the exponent 5.1 and none at all at 4.8.—The hydrogen ion concentration decreased during growth. The greatest change occurred in the potato-tartrate medium, the changes in exponent ranging from 0.3 to 2.32.

310. Glaser, R. W., The polyhedral virus of insects with a theoretical consideration of filterable viruses generally. *Science* 48: 301-302. 1918.—Passage experiments with gypsy moth larvae which seem to demonstrate that the wilt disease of larvae is not caused by an enzyme but by an ultra-microscopic organism, which is capable of passing through a coarse (N) Berkefeld filter. The virus gained in virulence in the fourth passage (the interval from infection to death was reduced). Since certain substances, like chromatin, increase progressively, author resorts to a comparison with other filterable virus diseases in some of which an organism has been cultured, and presents a table summarizing the characteristics of this virus.—Author believes that filterable viruses probably realize Osborn's "hypothetical chemical precellular stage."

311. Gravatt, G. Flippo, and G. B. Posey, Gipsy-moth larvae as agents in dissemination of the white pine blister rust. *Jour. Agric. Res.* 12: 459-462. 1918.—The larvae of the gipsy moth (*Porthetria dispar*) are found to feed on both the spores and hyphae of the aecial stage of *Cronartium ribicola*. In many cases spore production is stopped by the destruction of fruiting hyphae. The alimentary tracts of larvae taken from rust pustules were found to contain as many as 48,000 and an average of 26,000 spores each. Examination of the excreta indicated the passage through the intestines of over 300,000 spores per day. Germination tests indicated, but did not conclusively prove, injury to the spores in passing through the larvae. Thousands of spores were also found adhering to the bodies of the larvae. They feed on the leaves of Ribes and infections on Ribes have apparently been traced to such feeding. As the larvae are known to be sometimes carried by wind as far as twenty miles, they become possible agents of long-distance as well as short-distance spread of the disease within the area infested by the gipsy moth.—CARL HARTLEY.

312. Gunderson, A. J., Results of spraying experiments at Flora. *Trans. Illinois Hort. Soc.* 51: 406-412. (1917) 1918.—Experiments were conducted especially in an effort to find a satisfactory spray schedule for control of apple blotch caused by *Phyllosticta solitaria*. It was found useless to attempt to kill the fungus in the cankers by use of dormant sprays including "scalecide." The use of lime-sulfur spray 3 and 5 weeks after the fall of the bloom successfully controlled blotch under conditions in 1917. Blotch was not controlled by dusting with sulfur.—H. W. ANDERSON.

313. Güssow H. T., A new method for "hanging drop" cultures. *Phytopath.* 8: 447. 1918.—The drop is flattened out in a thin film by placing a small cover glass on it. The method possesses possibilities for the study of anaerobic organisms.

314. Güssow, H. T., Microphotography simplified. *Phytopath.* 8: 447-448. 1918.—Method of making photomicrographs is described. A simple drawing apparatus is used, superfluous light is excluded and photographic paper is substituted for drawing paper. This gives negative prints.—Additional apparatus is described for making exposures on photographic dry plates.

315. Headlee, Thomas J., Geo. A. Dean and E. D. Ball, Report of the special committee appointed to formulate the attitude of the American Association of Official Horticultural Inspectors on the question of prohibiting importation of nursery stock from foreign countries. *Phytopath.* 8: 170. 1918.—Resolutions favoring prohibition.

316. Henderson, M. P., The black-leg disease of cabbage caused by *Phoma lingam* (Tode) Desmaz. *Phytopath.* 8: 379-431. 10 fig. 1918.—A monographic treatise.—Purpling of foliage is not a good diagnostic character.—Fungus produces sub-epidermal ostiolate pycnida on living tissue and superficial, beaked pycnidia on dead parts.—Mycelium intercellular at first becoming intracellular and causing collapse of tissue.—*Phoma oleracea* and *P. brassicae* are synonyms, possibly also *P. napobrassicae*. "*P. oleracea*" on *Melilotus alba* is distinct.—Fungus is a vigorous parasite, infection resulting readily from wound inoculations, spraying on a spore suspension, wetting roots in a spore suspension at time of transplanting or wetting

seeds with suspension at planting time.—Incubation period varies from 7 to 28 days. Many cultivated varieties of Brassica are susceptible as well as wild species of this and other cruciferous genera.—Mother seed plants are susceptible in all parts and the mycelium may pass through the wall of the silique into the young seeds where it persists until the following year. Aside from perennation in the seeds the fungus persists over winter in dead plant parts.—Surface disinfection of seed is accomplished best by treatment for 21 minutes in 1:200 solution of 40 percent formaldehyde.—Spraying seed-bed and seedlings with Bordeaux mixture is not effective.—Removal of diseased host tissue with a fine screen prevents infection in the seed-bed.—Covering badly diseased host tissue with 4 inches or more of uncontaminated soil yields diseased-free seedlings.—Removal of diseased plants and deep, fall plowing suggested for control in field.

317. Hoffer, G. N., and J. R. Holbert, Results of corn disease investigations. Science 47: 246-247. 1918.—Occurrence of barren stalks and stalks bearing only nubbins is correlated with certain pathological conditions in the plants. In corn grown from ears which presented this pathological condition in seedlings, 15 percent of plants were barren compared with 6 percent from ears not revealing this condition.—Diseased seedlings develop from seeds disinfected externally and grown in flasks of sterilized agar. Bacteria appear which rot seedling root tips. Species of *Fusarium* also appear. Selfed plants from disease-free seedlings gave only 1.5 percent barren plants.—All kernels on any one ear are not infected internally.

318. Holton, John C., The theory and practice of sanitary precautions in grove and packing house operations. Florida State Plant Bd. Quart. Bull. 2: 161-179. 1918.—50 percent of the citrus packing house operators followed regulations of the Board.—Data on practical operation of application of sanitary measures in packing house operations.

319. Holway, E. W. D., Infected grass seeds and subsequent rust development. Phytopath. 8: 169. 1918.—Quotation from McAlpine, the Rusts of Australia. *Puccinia beckmanniae* developed in Australia on plants grown from seeds of *Beckmannia erucaeformis* Host. sent there from U. S. A. In the same way *Puccinia impatientis* was carried with seeds of *Elymus condensatus*.

320. Hungerford, Chas. W., Field conference of cereal pathologists. Science 48: 148-150. Aug. 9, 1918.—Brief summary reports of progress on investigations by various workers and discussions of methods of control of cereal diseases. The following subjects are considered: Barberry eradication, stem rust (*P. graminis*), leaf rust (*P. triticea*), bacterial diseases of cereals, smuts, smut eradication, seed treatment methods. Resolutions were adopted (1) endorsing the barberry eradication campaign as a means of reducing the amount of stem rust and (2) recommending to the Federal Horticultural Board the use of proper precautions to prevent the possible introduction of certain wheat diseases on grain from Australia.

321. Jones, L. R., Disease resistance in cabbage. Nat. Acad. Sci. Proc. 4: 42-46. 1918.—Jones reports that by selecting fifty individual cabbage plants which were most resistant to the attacks of *Fusarium conglutinans* as judged by their behavior on "cabbage sick" soil in 1910, he was able to obtain, in the second generation, from these, individual strains which are highly resistant and of commercial value. His results show that the disease resistant character is fixed and heritable. Better resistance was obtained in the second than in the first generation from selected individuals. The variation in susceptibility shown by individuals of the second generation suggests that further improvement may be possible through continued selection.—The author comments on the work of W. H. Tisdale which seems to show that the parasite invades root tissues of resistant cabbages more slowly than in the case of susceptible plants. He also refers to the experiments of J. C. Gilman which indicate that under 17°C. the fungus is not able to attack the most susceptible plants.—L. O. KUNKEL.

322. Jones, L. R., and W. W. Gilbert, Lightning injury to herbaceous plants. Phytopath. 8: 270-280. 2 fig. 1918.—A record of observations by the authors and others of the effect of strokes of lightning on potato, cotton, tobacco, cucumber and tomato. Killed

areas vary in diameter from 10 to 30 feet and are roughly circular in outline. There is usually a marginal band of partially killed plants. The greatest damage seems to occur when the stroke occurs soon after rain begins and the explanation is offered that moist surface soil, underlaid by dry soil, would favor wider diffusion of the shock. The balance of evidence is in favor of the conclusion that certain herbaceous crops, e.g., potatoes, sugar beets and cotton, suffer more regularly and seriously from lightning stroke than others, e.g., cereal and forage crops.

323. Lewis, A. C., Facts of interest about the Georgia State Board of Entomology. Georgia State Bd. Ent. Circ. 28: 1-12. 1918.—Popular account of work in the control of diseases and insects.

324. Long, W. H., and R. M. Harsch, Aecial stage of *Puccinia oxalidis*. Bot. Gaz. 65: 475-478. May, 1918.—An undescribed *Aecium* on *Berberis repens* near Albuquerque, New Mexico, was found in close association with *Oxalis violacea* upon which occurred urediniospores of *Puccinia oxalidis*. Field and laboratory experiments proved the relation between the two. *Puccinia oxalidis* therefore has its pycnia and aecia on *Berberis repens* while uredinia and telia occur on *Oxalis violacea* and other species.—H. W. ANDERSON.

325. Long, W. H., and R. M. Harsch, Pure cultures of wood-rotting fungi on artificial media. Jour. Agric. Res. 12: 33-82. 1918.—Cultures of hymenomycetes were grown on plant infusion agar media. The color of the submerged mycelium, the color and general appearance of the aerial mycelium, and certain other characters, were found to have diagnostic value. Some of the vegetative cultural characters of several polypores are shown in tabular form to illustrate the information which the behavior of artificial cultures may give as to the relationships of fungi from different sources. Characters of artificial cultures are especially valuable for the identification of the causal organisms in decayed wood on which no sporophores have been formed.

The production of sporophores in artificial culture gives additional data for identification. While the writers were unable to secure any entirely typical pilei, forty-two species, representing four different hymenomycetous families, were induced to form sporophores on nutrient agar in 20 mm. tubes. Carrot, malt, and parsnip agars were found best adapted for this phase of the work. Rather strong light proved especially favorable to sporophore production although three species were induced to fruit in darkness. The position of the pileus was determined by the direction of the source of light, while gravity was the determining factor in the position of pores. The use of small fragments of sporophore in inoculating the agar resulted in especially prompt formation of sporophores. It also resulted in sporophore production on media on which none were produced following inoculation with spores or mycelium.—CARL HARTLEY.

326. Lyman, G. R., The relation of phytopathologists to plant disease survey work. Phytopath. 8: 219-228. 1918.—A description of the scope, operation and aims of the federal plant disease survey, or intelligence service, and a plea for coöperative endeavor.

327. Lyman, George Richard, Plant disease survey work on the Physoderma disease of maize. Journ. Wash. Acad. Sci. 8: 43-44. Jan. 19, 1918.—Abstract of paper read before the Botanical Society of Washington, Nov. 6, 1917.

328. MacInnes, F. J., The occurrence of *Alternaria* in a characteristic apple spot and an apple rot caused by *Gliocladium viride*. Trans. Illinois Acad. Sci. 10: 218-229. Pl. I-IV. (1917) 1918.—An *Alternaria* was found associated with a peculiar lesion on a number of apples obtained from an orchard near Harristown, Illinois. The spots vary from 2 mm. to 3 cm. in diameter and penetrate the flesh only to a depth of about 2 mm. No inoculation studies are reported.—A fungus found in plates made from rotting apples and determined by Dr. Chas. Thom to be *Gliocladium viride* was found to cause a soft rot when inoculated into ripe apples.—H. W. ANDERSON.

329. Martin, W. H., Dissemination of *Septoria lycopersici* Speg. by insects and pickers. *Phytopath.* 8: 365-372. 1918.—After the diseases appear in the field insects captured either on diseased or healthy plants are shown to carry, in large numbers, spores of *Septoria lycopersici* and of *Alternaria solani*. The insects examined were *Leptinotarsa decemlineata* larvae and adults, and *Protoparce carolina*.—Insect excreta removed from healthy plants was examined and spores of the two organisms found in small numbers, some of them germinating. Experiments in moist chambers confirm the results of field tests.—Spores of these two parasites were found abundantly on the hands and garments of pickers and it is believed that epiphytotics are brought about through this agency.
330. Martin, George W., Brown blotch of the Kieffer pear. *Phytopath.* 8: 234-239. f. 1-8. 1918.—The lesions are superficial and at first circular with indefinite margins. By fusion large irregular blotches, covering a part or all of the fruit, are formed. They resemble the natural russet coat of certain varieties. A fungus, closely related to *Leptothyrium pomi*, is said to cause the disease. The mycelium and sclerotia, however, are not superficial but are imbedded in the cutin and cause excessive suberization and hypertrophy of subcuticular layers of the fruit. The disease is best controlled by two late (July and August) treatments of Bordeaux mixture.
331. Matz, J., Diseases and insect pests of the pecan. *Florida Agric. Exp. Sta. Bull.* 147: 135-162. 1918. (Part I.—Diseases, p. 135-150.) A compilation on several common pecan diseases, with special attention to symptoms and control measures.—L. R. HESLER.
332. Matz, J., Report of laboratory assistant in plant pathology. *Florida Agric. Exp. Sta. Rept.* 1917: 87R-94R. 1918.—Two pecan diseases are discussed, dieback, which is evidently due to *Botryosphaeria berengeriana*, and a leaf spot, proved to be caused by an undescribed species of *Gnomonia*.—L. R. HESLER.
333. Matz, J., A method for making permanent mounts of entire colonies of some fungi in plate cultures. *Phytopath.* 8: 446-447. 1918.—A thin film of medium is used. Organism is allowed to spread over medium and up the side of the plate. The medium is allowed to dry out and is then dissolved away with boiling water. The mycelium remaining is dehydrated with alcohol and may be stained if desired.
334. McClintock J. A., Further evidence relative to the varietal resistance of peanuts to *Sclerotium rolfsii*. *Science* 47: 72-73. 1918.—Variety "Virginia bunch" is susceptible, variety "Virginia runner" practically immune.
335. McCubbin, W. A., Public school survey for currant rust. *Phytopath.* 8: 294-297. 1918.—The machinery of the public school system was employed to make a survey for the currant rust, *Cronartium ribicola*. Form letters are reproduced. Comparison of effectiveness of survey by school children and by professional scouts indicates that the former is much more effective.
336. McCulloch, Lucia, A morphological and cultural note on the organism causing Stewart's disease of sweet corn. *Phytopath.* 8: 440-442. Pl. 1. 1918.—Organism is without flagella and is referred to as *Aplanobacter Stewarti*.—Organism produces two distinct types of surface colonies on peptonized beef agar plates. One has a smooth flat surface, the other a definite central depression. No other known difference exists. All the colonies of any one isolation are of the same type.
337. Miles, L. E., Some new Porto Rican fungi. *Trans. Ill. Acad. Sci.* 10: 249-255. fig. 1-3. (1917) 1918.—Nine new species of *Mycosphaerella* and one each of *Helminthosporium* and *Cercospora* are described.—H. W. ANDERSON.
338. Millér, F. H., Disease control and forest management. *Jour. Forestry* 15: 974-977. 1918.—The author discusses briefly the effect of forest tree diseases upon forest management. "The combining of disease control with intensive forest management calls for an adjustment

of the rotation, cutting cycle, and marking rules in such ways as, in the case of enphytotics, to control the disease by measures of sanitation, and by limiting the felling age so that loss is minimized; and in the case of epiphytotics, to make 'sanitation' cuttings, or damage cuttings, or both, and employ certain silvicultural measures, such as the substitution of other species which are more resistant or immune." An example is given of a working plan for a forest in Saratoga Co., New York, which takes into account the chestnut blight and apparently the white pine blister rust. The paper is largely based on previous papers by Meinecke and by Recknagel.—HAVEN METCALF.

339. Murphy, Paul A., and E. J. Wortley, Determination of the factors inducing leafroll of potatoes particularly in northern climates. First progress report. *Phytopath.* 8:150-154. 1918.—The work shows that healthy plants grown in rows and separated from diseased hills by 30 inches only, developed the disease to the extent of 89.5, 50, and 19.4 per cent, respectively. The probability of the spread of the disease from certain centers has endangered the safety of hill selection and to eliminate the danger from infection, it is advised that in experiments the rows be at least six feet apart.—ERNST ARTSCHWAGER.

340. O'Gara, P. J., The white-spot disease of alfalfa. *Science* 48: 299-301. 1918.—Disease is found to be prevalent and troublesome in the western States. Basing statement on data which are not presented author concludes that the spots are due to a disturbance of physiologic balance between water absorption and transpiration.—C. T. GREGORY.

341. Osner, Geo. A., Additions to the list of plant diseases of economic importance in Indiana. *Proc. Indiana Acad. Sci.* 1916: 327-332. (1917) 1918.—A record of fifty-three diseases of cultivated plants not previously reported from Indiana. [Supplementary to: Pinal, F. J., A List of Plant Diseases of Economic Importance in Indiana. *Proc. Indiana Acad. Sci.* 1915: 379-413. 1916.]—H. S. JACKSON.

342. Parker, J. H., Greenhouse experiments on the rust resistance of oat varieties. U. S. Dept. Agric. Bull. 629: 1-15. *pl. 1-2, f. 2.* 1918.—Tests of the resistance of oat varieties to crown rust (*Puccinia lolii avenae* McAlpine) and stem rust (*Puccinia graminis avenae* Erikss. and Henn.). Both of these rusts are widely distributed in the United States but stem rust causes the greater loss in the northern states while crown rust does more damage in the South. Resistance is judged by length of incubation period, formation of flecks or large dead areas, small uredinia, small number of uredinia and in the case of crown rust the production of normal telia on the seedling leaves. Of 122 varieties tested, 80 showed no resistance to either rust. 16 out of 23 varieties belonging to the red oat group showed some resistance to crown rust. Several varieties of this group were very susceptible to crown rust and all were susceptible to the stem rust. White Tartarian and Ruakura were the only varieties showing any resistance to stem rust.—L. O. KUNKEL.

343. Peltier, George L. and David C. Neal, A convenient heating and sterilizing outfit for a field laboratory. *Phytopath.* 8: 436-438. 2 fig. 1918.—Small autoclave now on market for home canning purposes is heated with a blue flame gasoline burner.

344. Perrine, W. S., Adjusting the spray schedule on certain varieties of apples. *Trans. Illinois Hort. Soc.* 51: 388-398. (1917) 1918.—Each variety of apple varies in its relative susceptibility to blotch, scab, and codling moth. Some varieties are seriously injured by spray mixtures that cause no damage to others. On this account it is shown that it pays to consider the varieties individually in spraying. Schedule for Transparent, Duchess, Grimes, Jonathan, Chenango, York Imperial, Benoni, and Ben Davis are discussed.—H. W. ANDERSON.

345. Perrine, W. S., Orchard spraying. *Trans. Illinois Hort. Soc.* 51: 265-274. (1917) 1918.—A discussion of apple spraying from the standpoint of the practical orchardist.—H. W. ANDERSON.

346. Pickett, B. S., Spraying apples. Trans. Ill. Hort. Soc. 51: 328-338. (1917) 1918.—The fundamental principles of spraying are discussed.—H. W. ANDERSON.
347. Pickett, B. S., O. S. Watkins, W. A. Ruth and A. J. Gunderson, Field experiments in spraying apple orchards in 1913 and 1914. Illinois Agric. Exp. Sta. Bull. 206: 427-509. f. 1-6. Apr., 1918.—A detailed account is given of spraying experiments at Neoga, Flora and Griggsville. The financial gain through spraying is demonstrated. Lime-sulfur solution proved to be better than Bordeaux mixture as a spray on account of the foliage and fruit injured by the latter. A number of brands of arsenate of lead were tested, demonstrating that all the standard brands are about equally effective. New and proprietary fungicides were shown to cost more and as a rule were less effective than known standard mixtures. It was demonstrated that high pressures give more effective control than low pressures and do not cause injury where the quantity of spray applied is controlled. The authors recommend the use of lime-sulfur solution for the cluster bud, calyx and other sprays applied in May or during cool weather in June but recommend Bordeaux mixture for hot weather in June and during remainder of the season. Recommendations based on these experiments are given in the form of a spray schedule.—H. W. ANDERSON.
348. Pierce, Roy G., Notes on Peridermiums from Ohio: Need of pathological viewpoint in nursery inspections. Phytopath. 8: 292-294. 1918.—*Peridermium carneum* is reported from various places in Ohio on species of *Pinus* including *P. austriaca* and *P. laricio*. *Colosporium vernoniae*, II, was found later in the year on *Vernonia maxima* in close proximity to one of the diseased pines.—*Peridermium comptoniae* is reported on two species of *Pinus* apparently brought in one diseased nursery stock.
349. Pipal, F. J., The effect of hydrogen peroxide in preventing the smut of wheat and oats. Proc. Indiana Acad. Sci. 1916: 378-381. (1917) 1918.—Hydrogen peroxide reduced percentage of stinking smut of wheat, *Tilletia foetens*, by about one-half, when diluted one to ten, and about one-third when used full strength. It was partially effective in controlling the oat smuts, *Ustilago avenae* and *U. laevis*, when diluted 1:15 and 1:10 or when used full strength. Hydrogen peroxide, however, did not compare favorably with the standard formaldehyde treatment.—H. S. JACKSON.
350. Potter, Alden A., The effect of disinfection on the germination of cereal seed. Phytopath. 8: 248-249. 1918.—A critique of methods of sampling based on the idea that the purpose of testing effect of disinfection on germination of seed is to determine what proportion of viable seed contained in original sample has been killed by treatment, and not to discover what proportion of whole lot is viable after treatment.
351. Reddick, Donald, Lightning injury to grape vines. Phytopath. 8: 298. 1918.—When lightning strikes in a grape trellis varying degrees of injury to the vines result. In the case of light strokes the vines of the trellis may show partial wilting with subsequent recovery or the plants may be killed to the ground, the roots, however, remaining uninjured.
352. Reddick, Donald, Palladin's Plant Physiology. (Review.) Phytopath. 8: 373. 1918.
353. Reddick, D., Annals of the Phytopathological Society of Japan. (Review.) Phytopath. 8: 444-445. 1918.
354. Rhodes, Arthur S., Some new or little known hosts for wood-destroying fungi II. Phytopath. 8: 164-167. 1918. The fungi reported are *Schizophyllum commune* on *Pinus virginiana*, *Pleurotus serotinus* on *Tsuga canadensis*, *Hymenochaete agglutinans* on *Morus rubra* and *Liquidambar styraciflua*, *Stereum* sp. on *Ginkgo biloba*, *Guepinia spathularia* on *Juniperus virginiana*, *Polyporus dichrous* on *Picea rubens*, *P. obtusus* on *Fagus atropurpurea*, *P. versicolor* on *Ginkgo biloba*, *P. hirsutus* on *Ginkgo biloba*, *P. pargamensis* on *Pinus virginiana* and *P. gilvus* on *Rhus toxicodendron*.

355. Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel and Carl Hartley, Host relationships of the North American rusts, other than Gymnosporangiums, which attack conifers. *Phytopath.* 8: 309-352. 1918.—The previously published facts and much new information concerning 52 species (in 14 genera) of the rust fungi are here brought together. The pathological significance of these rusts and other generalizations are made clear in the introduction. Complete information concerning the synonymy, citations to literature, the known hosts and the distribution of each species are given together with a brief summarization of the experimental work establishing the cycle of spore forms. The unconnected aecial forms are treated similarly. A list of the unattached rusts aecia of which are likely to be found on conifers is given. A host index by species for the conifers and by genera for the dicotyledons is given for all the rust fungi included in the paper. A bibliography of 148 titles is appended.—W. H. RANKIN.

356. Rolfs, P. H., Citrus diseases. *Florida Agric. Exp. Sta. Rept.* 1917: 10R-11R. 1918.—A brief summary of the work performed by the staff in plant pathology. [See *Bot. Absts.* 1, 330, 331, 358-360, 368.]

357. Sharples, A., *Ustulina zonata* (Lev.) Sacc. on *Hevea brasiliensis*. *Ann. Appl. Biol.* 4: 153-178. *Pl.* 3-8. 1918.—Fungus, which is common on felled trunks and stumps of rubber and other soft-wood trees, causes a disease of rubber trees known as collar rot. Disease has been prevalent in F. M. S. since 1912 and is now widespread in old plantations. Injury usually confined to an area at collar but fungus may spread up or down for several feet. Foliage becomes sparse and latex can not be obtained from the side of tree on which lesion occurs.—Shot-hole borer (*Xyleborus parvulus*) makes infection courts.—Complete description of fungus in all stages, cultural characters, pathological histology and an account of inoculation experiments.—Recommendations for control based on observations and deduction consist essentially of employing sanitary measures.—Paper closes with a strong appeal for coordinated fundamenatal research on the part of the British government, of numerous problems of the rubber industry.

358. Shear, C. L., Pathological aspects of the federal fruit and vegetable inspection service. *Phytopath.* 8: 155-160. 1918.—In order to protect and conserve perishable crops to the fullest extent they must be studied in transit and distribution, and a thorough knowledge obtained of the rots and other forms of spoilage which so frequently occur after the product has left the grower. The practical execution of the Food Products Inspection Law of August 10, 1917, is explained and estimates of losses in transit given. The greatest success in carrying out the project can be obtained only by active and sympathetic cooperation of growers, shippers, carriers, distributors, inspectors and pathologists.

359. Sherbakoff, C. D., Report of associate plant pathologist. *Florida Agric. Exp. Sta. Rept.* 1917: 76R-86R. 1918.—Chief attention is given to seed-bed diseases of vegetables, tomato buckeye rot and pineapple wilt. It is found that *Rhizoctonia solani* is the most common damping-off fungus. The author concludes that it occurs in new soil and that it is at times introduced into the seed-bed with seed. Similarly *Phomopsis vexans* is carried into the seed-bed with the seed. In the field the latter organism causes an undescribed disease of eggplant called tipover. Preliminary studies on a little-known bacterial spot of pepper are reported. Pink joint, also a disease of pepper, is regarded as possibly due to *Sclerotinia libertiana*. Appended are brief notes on other important diseases of tomato, potato, pepper, celery and watermelon. Progress is reported on pineapple wilt (possibly due to nematodes).—L. R. HESLER.

360. Sherbakoff, C. D., Some important diseases of sweet potato. *Florida State Plant Bd. Quart. Bull.* 2: 179-189.—Compiled.

361. Sherbakoff, C. D., Tomato diseases. *Florida Agric. Exp. Sta. Bull.* 146: 119-132. *fig.* 32-42. 1918.—Descriptions and illustrations of the diseases of tomatoes occurring in Florida

with recommendations for control. Causal organisms not mentioned except in names of the diseases. Diseases discussed are: bacterial blight, septorial blight, sclerotial blight, *Phytophthora* blight, fusarial blight, macrosporial blight, Phoma spot, buckeye rot (*Phytophthora terrestris*), brown rot (*Rhizoctonia solani*), bacterial soft rot, blossom-end rot, root knot.—I. C. JAGGER.

362. Smith, Erwin F., and G. H. Godfrey, Brown rot of Solanaceæ on *Ricinus*. Science 48: 42-43. 12 July, 1918.—*Bacterium solanacearum* attacks the castor oil plant (*Ricinus communis*) in various stages of growth producing a wilt. Evidence is presented to prove the identity of the organism. Land on which any of the common solanaceous plants have wilted should not be planted to *Ricinus*.

363. Smith, Ralph E., The beet leafhopper and the curly-leaf disease that it transmits. [Review of Utah Agric. Exp. Sta. Bull. 155.] Phytopath. 8: 168. 1918.

364. Spaulding, Perley, Some biological aspects of the spread of the white pine blister rust. Jour. Washington Acad. Sci. 8: 40-41. 19 Ja 1918.—Abstract of paper read before Biological Society of Washington, Nov. 17, 1917.

365. Stakman, E. C., and C. R. Hoerner, The occurrence of *Puccinia graminis tritici-compacti* in the southern United States. Phytopath. 8: 141-149. 1918.—The biologic form of *Puccinia graminis tritici*, has been found in the states of Washington, Oregon, Alabama, Louisiana, south-eastern Texas, and possibly Virginia.

Extensive infection experiments demonstrate that the southern and northern strains of *Puccinia graminis tritici-compacti* are the same. The difference between this form and *P. graminis tritici* is constant, not a local variation. In the majority of the varieties and species of wheat tested there is evident a very decided difference in the pathogenicity of the two biologic forms. The varieties which are susceptible to *P. graminis tritici* are usually resistant to *tritici-compacti*. There are indications that resistance to *tritici-compacti* varies directly with the hardness of the wheat. Note is made of the fact that the southern wheats are largely soft whereas the northern spring wheats are hard. This may have especial significance in epiphytology studies.—Morphologically the spores of *tritici-compacti* are distinctly different from those of *P. graminis tritici* and can be readily distinguished by measurement.—The suggestion is made that the *tritici-compacti* form of *P. graminis* is present in the south whereas *P. graminis* is prevalent in the north. This may be evidence that the south to north dissemination of this fungus does not occur.—C. T. GREGORY.

366. Stevens, F. L. Porto Rican fungi, old and new. Trans. Illinois Acad. Sci. 10: 162-218. figs. 1-13. (1917) 1918.

367. Stevens, F. L., and H. W. Anderson, Protect the wheat crop. Eradicate the common barberry from Illinois. Univ. Illinois Col. Agric. Extension Circ. 22: 1-4. f. 3. 1918.

368. Stevens, H. E., Lightning injury to citrus trees in Florida. Phytopath. 8: 283-285. 1 fig. 1918.—Injury is of fairly frequent occurrence and not confined to any one region. From a few to thirty trees may be injured at one stroke. When the trunk is struck the injury is represented by a narrow strip of dead bark, 1 to 5 cm. or more in width, extending downward to the surface of the soil. At the base of the trunk the injured area may extend to completely girdle the tree. The tissue is killed down to the hardened xylem.

Usually one or two trees are severely injured or killed. Adjacent trees show injury on scattered twigs and branches where characteristic spots or blotches are produced. The spots are greenish-yellow and vary in size and shape. They may involve a few square millimeters or may extend 10 cm. and envelop the twig. Usually the injured areas are superficial. Injured areas are usually invaded by fungi.

369. Stevens, H. E., Report of plant pathologist. Florida Agric. Exp. Sta. Rept. 1917: 66R-75R. 1918.—The report covers citrus diseases. The cause of gummosis remains un-

solved. Young lesions yield no organisms although *Phomopsis citri*, *Diplodia natalensis* and several other organisms are associated with older spots. Inoculation experiments were unsatisfactory. Pruning offers promise for the control of melanose. Tests show that the citrus canker organism (*Ps. citri*) not only survived 26 months in relatively dry soil but retained its pathogenicity. Studies indicate that *Phytophthora terrestris* may cause foot rot. Brief notes are given on anthracnose, withertip, scab and an apparently new fruit spot.—L. R. HESLER.

370. Stewart, V. B., Exclusion legislation and fruit tree production. *Phytopath.* 8: 160-164. 1918.—It appears unwise to prohibit importation of living plants when such plants can not be produced successfully at home. Attempts in U. S. A. to grow many kinds of fruit tree seedlings have usually resulted in plants inferior to foreign-grown stock. American growers of seedling stock are largely dependent on imported seed.—Crown gall caused by *Bacterium tumefaciens* has proved a limiting factor in seedling production in American nurseries.—It is questioned whether prohibition of importation is necessary at the present time, the contention being that all the important diseases and pests of nursery stock have been brought in repeatedly during the long period of free intercourse.

371. Stone, R. E., Incubation period of *Cronartium ribicola* on the white pine. *Phytopath.* 8: 438-440. *Fig. 1.* 1918.—In 70 percent of the cases examined the period of incubation could not have been longer than 2 years and 10 months. In the remaining cases the period may have been a year longer.

372. Tanaka, Tyôzaburô, Citrus canker in Japan: A translation of the first description of this disease, from the Japanese. *Phytopath.* 8: 443-444. 1918.—Original article by Kumanosuke, Abe, A new kind of pathogenic microbe: being No. 8 of the organisms injurious to citrus. *Nippon no Mikan* 37: 162-165. 1904.

373. Thomas, H. E., Cultures of *Æcidium tubulosum* and *A. passifloriicola*. *Phytopath.* 8: 163-164. 1918.—Cultural proof of the connection of *Æcidium tubulosum* Pat. & Gaill. on *Solanum torvum* Sw. with *Puccinia substriata* Ell. & Barth. on *Paspalum paniculatum* and of *Æcidium passifloriicola* P. Henn. on *Passiflora rubra* with *Puccinia sclerix* (Paz.) Arth. on *Scleria pterota*.

374. Turner, William F., *Nezara viridula* and kernel spot of pecan. *Science* 47: 490-491. 1918.—In Georgia, *Nezara viridula* attacks the cow pea by preference but when this host, which is used as a soiling crop in orchards, begins to dry the insects collect on the pecan. A severe infestation of insect in 1916 was coincident with an epiphytotic of kernel spot. The data show that the insect is an important agent either in the production of the disease or a carrier of *Coniothyrium caryogenum* to which Rand has attributed the disease.

375. Weir, James R., Effects of mistletoe on young conifers. *Jour. Agric. Res.* 12: 715-718.—The paper deals with the early stages of the effect of leafless mistletoes on young conifers. Measurements and photographs are given of young pines infected with *Razoumofskyia campylopoda*, and of *Pseudotsuga taxifolia* infected with *R. douglasii*. Both height growth, and for the latter host size of buds, is found to be less in selected infected trees than in vigorous uninfected trees of the same average age. Evidence is presented bearing on storage of food materials in the witches'-brooms resulting from mistletoe attack on pine and larch.—Trees infected when young rarely produce merchantable timber. The killing of old infected trees and the choice of uninfected sites for forest plantations are recommended to insure against infection of young stands.—CARL HARTLEY.

376. Weston, William H., The downy mildews of maize, their origin and distribution. *Jour. Washington Acad. Sci.* 8: 43. Jan. 19, 1918.—Abstract of paper read before Botanical Society of Washington, Nov. 6, 1917.

377. Whetzel, Herbert Hice, An outline of the history of phytopathology. 130 p., 22 portraits. W. B. Saunders Co., Philadelphia, 1918.

378. Worsham, E. Lee, Twentieth annual report of the State Entomologist for 1917. Georgia State Bd. Ent. Bull. 51: 1-44. 1918.—Cotton anthracnose was reduced by the use of seed selected from disease-free bolls. Treatment of infected seed with mercuric chlorid or sulfuric acid for 1 hour gave no result.—Practical control of angular leaf spot of cotton was secured by using seed two years old and also by treating seed 1 year old with mercuric chlorid or sulfuric acid for 1 hour.—88,000 inspections were made for citrus canker and 7 diseased trees found—The use of a dust mixture containing 90 percent sulfur did not give as good control of bitter rot of apples (*Glomerella*) as did bordeaux mixture. Varieties Winesap and Gano are susceptible to bitter rot, Yates and Terry Winter are practically immune.—Miscellaneous notes on diseases and insects of peaches, pecans, tomatoes, peppers and other truck crops.

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*.

[Unsigned abstracts are by the editor.]

BRYOPHYTES

379. Hurst, C. P., East Wiltshire mosses and hepatics. Jour. Bot. 56: 181-186. 1918.—The author gives a list of species with notes; no new species or combinations are published.

ALGAE

380. Cleland, Ralph E., Notes from the Woods Hole Laboratory—1917. II. A new *Erythrotrichia* from Woods Hole. *Rhodora* 20: 144-145. Pl. 124. 1918. [Edited by F. S. Collins.]—The new species, *E. rhizoidea*, growing on *Porphyra umbilicalis*, is described from Woods Hole Harbor, Massachusetts.

381. Collins, F. S., Notes from the Woods Hole Laboratory—1917. I. Species new to science or to the region. *Rhodora* 20: 141-143. Pl. 124. 1918.—A new species each of *Microchaete* and *Bulbochaete* are described. *Bulbochaete elatior* Prings. and *Mikrosyphar Porphyrae* Kuckuck are reported for the first time from America. *Chroococcus limneticus* Lem. and *Nostoc punctiforme* Hariot ex Bor. & Flah. are recorded as new for the Woods Hole, Massachusetts, region.

382. Hornby, A. J. W., A new British fresh water alga. New Phytol. 17: 41-43. Fig. 1-4. 1918.—A new species of *Endoderma*, *E. Cladophorae*, is described. The alga, occurring principally on *Cladophora*—rarely on *Rhizoclonium hieroglyphicum*, is at first strictly epiphytic, but later penetrates the lamellae of the host cell wall, resulting in a thallus two or three cells in thickness completely encircling the host filament.

383. West, G. S., A new species of *Gongrosira*. Jour. Roy Microsc. Soc. 1918: 30-31. 1 pl. 1918.—*Gongrosira scourfieldii*, a new lime-incrusted species of the genus, is described from Sidmouth, Devonshire.

FUNGI

384. Arthur, J. C., Uredinales of Costa Rica based on collections by E. W. D. Holway. *Mycologia* 10: 111-154. 1918.—There are listed here 118 rusts. The following are described as new: *Uromyces* (4 species), *Uredo* (3 species), *Ravenelia* (1 species), *Puccinia* (14 species), *Aecidium* (3 species). No new genera are proposed.—H. M. FITZPATRICK.

385. Arthur, J. C., Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. Bot. Gaz. 65: 460-474. 1918.—Critical notes on twenty-five species included in nine genera are given. *Puccinia Lagerheimiana* Diet. is transferred to a new genus, *Cleptomycetes*. The telial stages of *Uredo Bambusarum* P. Henn. and *Uredo Mogiphanis* Juel are described and the species transferred to *Puccinia*. Descriptions of one new species of *Uropyxis* and one of *Sphenospora* by G. Lagerheim are included. The author also describes five new species of *Puccinia* and one of *Aecidium*.—H. S. JACKSON.

386. Arthur, J. C., New species of Uredineae—X. Bull. Torr. Bot. Club 45: 141-156. 1918.—The author describes eight new species of *Puccinia*, two of *Uromyces*, ten of *Aecidium*, and three of *Uredo*, all from North America. The telial stages of *Aecidium Atriplicis* Shear and of *Uredo Heliconiae* Diet. are also described and the species transferred to the genera *Uromyces* and *Puccinia* respectively.

387. Arthur, J. C., and G. R. Bisby, An annotated translation of the part of Schweinitz's two papers giving the rusts of North America. Proc. Amer. Phil. Soc. 57: 173-292. 1918.—An extensive introduction includes a large amount of interesting information concerning the life of Schweinitz, his methods of work, and his herbarium which is now deposited in the rooms of the Academy of Natural Science of Philadelphia. An English translation of the remarks of Schweinitz on the rusts of North America in his two well known papers, is accompanied by many explanatory notes supplied by the authors and based on the critical examination of the specimens as they now exist in the herbarium. These notes are made in the attempt to verify certain of Schweinitz's statements, and to explain doubtful points. A complete list of all the Uredinales described by Schweinitz is given in chronological order. Another list shows the same species arranged according to modern conceptions of classification. Synonyms are cited in most cases. The paper renders available to students of the rusts many facts hitherto unavailable concerning the type specimens of North American Uredinales described by Schweinitz.—H. M. FITZPATRICK.

388. Arthur, J. C., and J. R. Johnston, Uredinales of Cuba. Mem. Torr. Bot. Club 17: 97-175. 1 pl. 1918.—The authors give an extensive historical account of the various rust collections which have been made in Cuba, followed by an enumeration, with notes, of all species (140 in number) which the various collections have thus far brought to light. New species are described of the following genera: *Cronartium*, 1; *Cionothrix*, 1; *Ravenelia*, 1 (on basis of uredinia alone); *Puccinia*, 3 (the type material of one of these, *P. fuscella*, was issued as No. 772 in Bartholomew's North American Uredinales' under the name *P. Vernoniae*); *Aecidium*, 2; *Uredo*, 3; *Uromycladium*, 1 (doubtfully). The telial stages of *Uredo notata* Arth., *U. Anthephorae* Sydow, *U. Gouaniae* Ellis & Kelsey, and *U. cristata* Speg. are described and the species published respectively under the new combinations and names *Cronartium notatum*, *Puccinia Anthephorae*, *Puccinia invaginata*, and *Uromyces Cupaniae*.

Puccinia macropoda Speg. (*Uredo striolata* Speg.) is published under the new combination *P. striolata*; *Allodus megalospora* Orton appears under the new combination *Puccinia megalospora*; and *P. aequinoctialis* Holw. (*Uredo Adenocalymnatis* P. Henn.) is published under the new combination *P. Adenocalymnatis*. A host index as well as an index to the species of Uredinales is appended.

389. Atkinson, G. F., Six misunderstood species of *Amanita*. Mem. Torr. Bot. Club 17: 246-252. 1918.—Critical notes on some species which according to the author have been misunderstood in recent American publications on the genus.

390. Boyce, J. S., Perennial mycelium of *Gymnosporangium blasdaleanum*. Phytopath. 8: 161-162. 1918.—See Entry 289.

391. Brandes, E. W., Anthracnose of lettuce caused by *Marssonina panattoniae*. Jour. Agric. Res. 13: 261-280. Pl. C and 20. 1918.—This name is merely a new combination applied by Magnus to the fungus commonly known in America as *Marssonina perforans*. The

name *Marssonia* is preoccupied by a Phanerogamic genus. The synonymy for this species is given here.—H. M. FITZPATRICK.

392. Brenckle, J. F., North Dakota Fungi—II. *Mycologia* 10: 199-221. 1918.—This list covers the basidiomycetes and fungi imperfecti. *Hendersonia Crataegi* on *Crataegus mollis* is described as new.—H. M. FITZPATRICK.

393. Burlingham, Gertrude S., New species of *Russula* from Massachusetts. *Mycologia* 10: 93-96. 1918.—Four new species are described. These are *R. Davisii*, *R. disparalis*, *R. pulchra*, and *R. perplexa*.—H. M. FITZPATRICK.

394. Burlingham, Gertrude S., A preliminary report on the *Russulae* of Long Island. *Mem. Torr. Bot. Club* 17: 301-306. 1918.—A list, with notes, of twenty-two American and fourteen European species of *Russula* occurring on Long Island, New York.

395. Burt, E. A., Corticiums causing Pellicularia disease of the coffee plant, Hypochnose of pomaceous fruits, and Rhizoctonia disease. *Ann. Missouri Bot. Gard.* 5: 119-132. *Fig. 1-3*. 1918.—The description of *Corticium koleroga* (Cooke) v. Höhn. is slightly broadened on the basis of specimens now known from widely separated regions. *Hypochnus ochroleucus* Noack is transferred to *Corticium* and published under the name *C. Stevensii*. Descriptions, synonymy, distribution, and critical notes are given for both species as well as for *C. vagum* Berk. & Curtis.

396. Carpenter, C. W., Wilt diseases of okra and the *Verticillium* wilt problem. *Jour. Agric. Res.* 12: 529-546. *Pl. A and 17-27*. 1918.—A comparative study of *Verticillium albo-atrum* in moist and dry air demonstrates that the type of conidium formation is not a sound basis for separation of the genera *Verticillium* and *Acrostalagmus*. The conidia of this species in moist air are held together in a spherical head of hygroscopic slime, as described for species of *Acrostalagmus*. Attention is called to the earlier work of Reinke and Berthold, recently generally overlooked, in which *Acrostalagmus* Corda is united with the older genus *Verticillium* Nees. Cross inoculations show that *Verticillium albo-atrum* causes a wilt disease of okra, snapdragon, eggplant, potato, cotton, *Xanthium* spp., and *Abutilon* spp. The suggestion is made that *Acrostalagmus albus*, *A. panax*, *A. caulophagus*, *A. vil-morinii*, and *V. dahliae* are all probably identical with *V. albo-atrum*, since in culture these fungi are not to be distinguished.—H. M. FITZPATRICK.

397. Coker, W. C., The Lactarias of North Carolina. *Proc. Elisha Mitchell Sci. Soc.* 34: 1-61. *Pl. 1-40*. 1918.—Fifty species and forms of *Lactaria* are listed, accompanied by descriptions and copious notes, and, in most cases, by full-page half-tone reproductions of photographs made by the author. Seven new species and a new form ("Form A") of each of three previously recognized species are described. A key to species is given.

398. Davis, J. J., *Tilletia* on wheat in North Dakota. *Phytopath.* 8: 247. 1918.—Brenckle's Fungi Dakotenses No. 132 labeled *Tilletia tritici* is here stated to be *T. laevis*.—H. M. FITZPATRICK.

399. Dodge, B. O., Studies in the genus *Gymnosporangium*—II. Report on cultures made in 1915 and 1916. *Bull. Torr. Bot. Club* 45: 287-300. *Pl. 8*. 1918.—Inoculations with *Gymnosporangium clavipes*, *G. macropus*, *G. globosum*, *G. Ellisii*, *G. clavariaeforme*, *G. juvenescens*, *G. nidus-avis*, *G. transformans*, and *G. fraternum* are discussed and the results tabulated.—H. M. FITZPATRICK.

400. Dodge, B. O., and J. F. Adams, Some observations on the development of *Peridermium cerebrum*. *Mem. Torr. Bot. Club* 17: 253-261. *Pl. 4-6. f. 1-3*. 1918.

401. Douglas, Gertrude E., The development of some exogenous species of Agarics. Amer. Jour. Bot. 5: 36-54. Pl. 1-7. 1918.—*Mycena subalkalina* Atkinson, occurring on decaying wood in the vicinity of Ithaca, New York, is incidentally described as a new species.—See Entry 65.

402. Enlows, Ella M. A., A leafblight of *Kalmia latifolia*. Jour. Agric. Res. 13: 199-212. Pl. 14-17. 1918.—The pycnidial stage of the causal organism is described under the name *Phomopsis Kalmiae* n. sp. The attempts to find an ascigerous stage were unsuccessful.—H. M. FITZPATRICK.

403. Fairman, Charles E., Notes on new species of fungi from various localities—II. Mycologia 10: 164-167. 1918.—The following new species are described: *Phoma verbascicarpa* on *Verbascum Blattaria*, *Phomopsis ericaceana* on *Azalea mollis*, *Sphaeropsis wistariana* on *Wistaria* (cult.), *Sphaeropsis Diervillae* on *Diervilla Diervilla*, *Camarosporium wistarianum* on *Wistaria* (cult.), *Rhabdospora translucens* on *Tecoma radicans*, *Microdiploia Diervillae* on *Diervilla Diervilla*, *Hendersonia hortilecta* on *Clematis paniculata*, *Dictyochora Gambellii* on *Zea mays*, *Platystomum phyllogenum* on *Anastraphia Northrupiana*. The last named species was collected in Cuba, the others in New York.—H. M. FITZPATRICK.

404. Faulwetter, R. C., The *Alternaria* leaf-spot of cotton. Phytopath. 8: 98-105. Fig. 1-3. 1918.—*Alternaria tenuis* Nees or a closely related species. See Entry 96.—H. M. FITZPATRICK.

405. Fitzpatrick, Harry M., The life history and parasitism of *Eocronartium muscicola*. Phytopath. 8: 197-218. Pl. 1, f. 1-7. 1918.—*Typhula muscicola* Fr., *Clavaria muscigena* Karsten, and *Eocronartium typhuloides* Atkinson are shown to be identical. The fungus takes, therefore, the older specific name *muscicola*. *Clavaria uncialis* Grev. is found not to be identical with *Clavaria muscigena* as believed by Karsten. All the known hosts of *Eocronartium muscicola* are listed. A review is given of what is known of the parasitic Auriculariaceae. See Entry 306.—H. M. FITZPATRICK.

406. Godfrey, G. H., *Sclerotium rolfsii* on wheat. Phytopath. 8: 64-66. Fig. 1. 1918.

407. Graff, P. W., Philippine micromycetous fungi. Mem. Torr. Bot. Club 17: 56-73. 1918.—The author describes one new species each of *Ascophanus*, *Meliola*, *Phyllosticta*, and *Actinothyrium*. In addition, fifty-two previously recognized species are listed with notes and principal synonymy. All the species reported are from the island of Luzon.

408. Harper, Ed. T., The *Clavaria fistulosa* group. Mycologia 10: 53-57. Pl. 3-5. 1918.—The following species are figured and discussed: *C. ardenia*, *C. fistulosa*, *C. macrorrhiza*, *C. contorta*, *C. juncea*.—H. M. FITZPATRICK.

409. Harter, L. L., A hitherto-unreported disease of okra. Jour. Agric. Res. 14: 207-212. Pl. 23. 1918.—The causal organism occurs on the stems and pods, and has been found on plants in Maryland and New York. It is here named *Ascochyta abelmoschi* n. sp., on account of its production of a large percentage of 1-septate spores. The examination of type material of *Phoma okra* Cke., and of two other collections of this species made by Langlois showed no septate spores.—H. M. FITZPATRICK.

410. Hedgcock, Geo. G., E. Bethel and N. Rex Hunt, Notes on some western Uredineae. Phytopath. 8: 73-74. 1918.—The spermagonia of *Peridermium pyriforme* and *P. filamentosum* are borne on the bark of the host in newly invaded areas one year preceding the appearance of the aecidia. *Peridermium filamentosum* and *P. harknessi* are regarded as probably distinct species although they both have their uredo and teleuto stages on *Castilleja* (*Cronartium coleosporoides*).—H. M. FITZPATRICK.

411. Hedgcock, Geo. G., and N. Rex Hunt, Notes on *Cronartium cerebrum*. *Phytopath.* 8: 74. 1918.—Inoculations made with pedigree cultures indicate that the fungus which forms the fusiform type of gall (*Peridermium fusiforme* Arth. & Kern) is distinct either racially or specifically from that forming the sphaeroid gall (*P. cerebrum* Peck).—H. M. FITZPATRICK.

412. Hoffer, Geo. N., An aecium on red clover, *Trifolium pratense* L. *Proc. Indiana Acad. Sci.* 1916: 325-326. 1917.—The author records the occurrence at Lafayette, Indiana, of the aecial stage of *Uromyces (Nigredo) fallens* (Desm.) Kern.—H. S. JACKSON.

413. Hopkins, E. F., The disease of tulips caused by *Botrytis parasitica*. *Phytopath.* 8: 75. 1918.

414. Jackson, H. S., Carduaceous species of *Puccinia*, I. Species occurring on the tribe Vernoniae. *Bot. Gaz.* 65: 289-312. 1918.—Descriptions or critical notes of 29 species of *Puccinia* from all parts of the world occurring on the host genera *Vernonia*, *Elephantopus* and *Piptocarpha* are given. Nine new species are described on *Vernonia* six of which were collected in Guatemala or Costa Rica and are described jointly with the collector E. W. D. Holway. The others are from Jamaica, Ceylon, and Bolivia. *Endophyllum Vernoniae* Arth. and *Argomyces Vernoniae* Arth. are transferred to *Puccinia* and new names proposed. *Argomyces insulanus* Arth. is also transferred to *Puccinia*.—H. S. JACKSON.

415. Jagger, I. C., and V. B. Stewart, Some *Verticillium* diseases. *Phytopath.* 8: 75. 1918.—See detailed account in: *Phytopath.* 8: 15-19. 1918.—H. M. FITZPATRICK.

416. Jagger, I. C., and V. B. Stewart, Some *Verticillium* diseases. *Phytopath.* 8: 15-19. 1918.—See Entry 109.

417. Johnston, John R., and Stephen C. Bruner, A *Phyllachora* of the royal palm. *Mycologia* 10: 43-44. *Pl.* 2. 1918.—*Phyllachora Roystoneae* n. sp.—H. M. FITZPATRICK.

418. Jones, Fred Reuel, Yellow-leafblotch of alfalfa caused by the fungus *Pyrenopeziza medicaginis*. *Jour. Agric. Res.* 13: 307-330. *Pl. D*, 25, and 26. 1918.—*Sporonema phacidioides* Desm. is shown to be the conidial stage of this fungus, rather than that of *Pseudopeziza medicaginis*. A complete synonymy is given.—H. M. FITZPATRICK.

419. Keitt, G. W., Inoculation experiments with species of *Coccomyces* from stone fruits. *Jour. Agric. Res.* 13: 539-570. *Pl.* 55-59. *f.* 1-3. 1918.—A preliminary paper recording the results of over one thousand cross inoculations with *Coccomyces* spp. isolated from common species of *Prunus*. No attempt is made to summarize the results bearing on the limits of the species of *Coccomyces* used, but a paper which is to follow will do so.—H. M. FITZPATRICK.

420. Lehman, S. G., Conidial formation in *Sphaeronema fimbriatum*. *Mycologia* 10: 155-163. *Pl.* 7. 1918.—*Sphaeronema fimbriatum*, the fungus causing a black-rot disease of the sweet potato, has two types of conidia termed "hyaline conidia" and "olive conidia." The olive conidia are here stated to be produced exogenously. The hyaline conidia resemble the endoconidia of *Thielavia* as described by Brierley in certain respects but differ in others. While the first two conidia are regarded as endoconidia those produced subsequently are said to be exogenously produced.—H. M. FITZPATRICK.

421. Levine, M., The physiological properties of two species of poisonous mushrooms. *Mem. Torr. Bot. Club* 17: 176-201. *Pl.* 1-2. 1918.—Photographic reproductions of *Panaeolus venenosus* Murrill and *P. retirugus* Fr. are given.

422. Levine, M. N., and E. C. Stakman, A third biologic form of *Puccinia graminis* on wheat. *Jour. Agric. Res.* 13: 651-654. 1918.—Stemrust collected on volunteer wheat at Stillwater, Oklahoma, is found to differ parasitically from *Puccinia graminis tritici* and *P. graminis tritici-compacti*. A new trinomial is not proposed.—H. M. FITZPATRICK.

423. Long, W. H., An undescribed canker of poplars and willows caused by *Cytospora chrysosperma*. Jour. Agric. Res. 13: 331-345. Pl. 27-28. 1918.
424. Long, W. H., and R. M. Harsch, Aecial stage of *Puccinia Oxalidis*. Bot. Gaz. 65: 475-478. 1918.—Field observations and culture experiments supporting the conclusion that a previously undescribed *Aecidium* having unusual morphological characters which occurs on *Berberis repens* in New Mexico is the aecial stage of *Puccinia Oxalidis* (Lev.) Diet. & Peck. A description of all stages of the species is given.—H. S. JACKSON.
425. Martin, George W., Brown blotch of the Kieffer pear. Phytopath. 8: 234-238. f. 1-8. 1918.—The fungus causing the disease is believed to be closely related to *Leptothyrium pomi*, or to be a variety of that organism. See Entry 330.—H. M. FITZPATRICK.
426. Melchers, L. E., Botrytis sp. causing severe injury to flowers and foliage of *Pelargonium hortorum*. Phytopath 8: 76. 1918.—A species said to be closely related to, if not identical with, *Botrytis cinerea*, causing a disease of geranium.—H. M. FITZPATRICK.
427. Melchers, Leo E., and John H. Parker, Another strain of *Puccinia graminis*. Kansas Agric. Exp. Sta. Circ. 68: 1918.—Stemrust collected on wheat in the field at St. Paul, Minn., is found to represent a third biologic form of *P. graminis* on wheat. It is able to infect varieties of hard winter wheat which are highly resistant to the two biologic forms previously described. The name *P. graminis tritici-inficiens* is applied.—H. M. FITZPATRICK.
428. Murrill, William A., Illustrations of fungi—XXIX. Mycologia 10: 177-181. Pl. 8. 1918.—*Mycena viscidipes*, *Laccaria amethystea*, *Leptonia conica*, *Laccaria striatula*, *Mycena galericulata*, *Omphalia fibula*, *Clitocybe farinacea*, *Marasmius dichrous*, and *M. institius* described and illustrated in colors.—H. M. FITZPATRICK.
429. Murrill, W. A., Illustrations of fungi—XXVIII. Mycologia 10: 107-110. Pl. 6. 1918.—*Trametes cinnabarina*, *Polystictus conchifer*, *Polyporus brumalis*, *Polyporus adustus*, *Polyporus amorphus*, and *Daedalea unicolor* described and figured in colors.—H. M. FITZPATRICK.
430. Murrill, William A., The Agaricaceae of tropical North America—VII. Mycologia 10: 15-33. 1918.
431. Murrill, W. A., The Agaricaceae of tropical North America—VIII. Mycologia 10: 62-85. 1918.
432. Murrill, W. A., Collecting fungi at Delaware Water Gap. Mem. Torr. Bot. Club 17: 48-51. 1918.—A list, including 182 species of Ascomycetes, Uredinales, Hymenomycetes, and Gasteromycetes, of fungi collected in 1917 in the region about Delaware Water Gap, Pennsylvania.
433. Osner, George A., Stemphylium leafspot of cucumbers. Jour. Agric. Res. 13: 295-306. Pl. 21-24. 1918.—*Stemphylium cucurbitacearum* n. sp.—H. M. FITZPATRICK.
434. Petch, T., Fungus diseases of food crops in Ceylon. Trop. Agriculturist 50: 159-163. 1918.—The principal fungus and bacterial parasites of important agricultural plants are listed.
435. Potter, Alden A., and G. W. Coons, Differences between the species of *Tilletia* on wheat. Phytopath. 8: 106-113. f. 1-4. 1918.—See Entry 133.
436. Pratt, O. A., Soil fungi in relation to diseases of the Irish potato in southern Idaho. Jour. Agric. Res. 13: 73-100. Pl. A and B. 1918.—Nearly seventy different species or strains of fungi isolated from the soil are listed. Detailed descriptions of five new species of *Fusarium* are included.—H. M. FITZPATRICK.

437. Rhodes, Arthur S., Some new or little known hosts for wood-destroying fungi. II. *Phytopath.* 8: 164-167. 1918.—See Entry 354.
438. Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel and Carl Hartley. Host relationships of North American rusts, other than gymnosporangiums, which attack conifers. *Phytopath.* 8: 309-352. 1918.—The North American species of *Cronartium*, *Coleosporium*, *Gallowaya*, *Melampsora*, *Pucciniastrum*, *Melampsoridium*, *Melampsorella*, *Calyptospora*, *Necium*, *Uredinopsis*, *Melampsoropsis*, and *Chrysomyxa*, and the unattached species of the form genera *Peridermium*, *Caeoma*, and *Uredo* which attack conifers are treated.—See Entry 355.—H. M. FITZPATRICK.
439. Roberts, John W., Plum blotch. *Phytopath.* 8: 74. 1918.—*Phyllosticta congesta* on Japanese varieties in Georgia.—H. M. FITZPATRICK.
440. Seaver, Fred. J., Photographs and descriptions of cup-fungi—VII. The genus *Underwoodia*. *Mycologia* 10: 1-3. Pl. 1. 1918.—Material of *Underwoodia columnaris* collected at Hudson Falls, N. Y., is figured and described.—H. M. FITZPATRICK.
441. Stakman, E. C., and G. R. Hoerner, *Puccinia graminis tritici compacti* in southern United States. *Phytopath.* 8: 77. 1918.—A short abstract. See more detailed account in *Phytopath.* 8: 141-149. 1918. See Entry 442.—H. M. FITZPATRICK.
442. Stakman, E. C., and G. R. Hoerner, The occurrence of *Puccinia graminis tritici-compacti* in the southern United States. *Phytopath.* 8: 141-149. 1918.—The discovery of this rust on different hosts in widely separated localities indicates that it is not merely a local variant form of *P. graminis tritici*. See Entry 441.—H. M. FITZPATRICK.
443. Standley, Paul C., Rusts and smuts collected in New Mexico in 1916. *Mycologia* 10: 34-42. 1918.
444. Stone, R. E., Orange rust of *Rubus* in Canada. *Phytopath.* 8: 27-29. f. 1. 1918.—Spores of the orange rust, from both blackberries and raspberries collected in Ontario, and sown on wet slides produced typical germ tubes with no signs of promycelial formation. Later in the season the 2-celled stalked teleutospores were collected from the same plants.—H. M. FITZPATRICK.
445. Tanaka, Tyôzaburô, New Japanese Fungi. Notes and translations—IV. *Mycologia* 10: 86-92. 1918.—*Botrytis liliorum* Y. Fujikuro on *Lilium longiflorum* Thumb., *Phyllosticta* (*Phoma*) *Kuwacola* K. Hara on leaves, shoots, and twigs of *Morus alba*, *Septobasidium acaciae* Sawada on *Acacia Richii*, *Cercospora pini-densiflorae* Hori et Nambu on needles of *Pinus densiflora*, *Helicobasidium Tanakae* Miyabe ex K. Sawada on *Morus*, *Vitis*, *Salix*, and other hosts in a considerable number of genera, *Nothopatiella moricola* I. Miyake on *Morus alba*, *Ustilina Mori* K. Hara on *Morus alba*, and *Valsa Paulowniae* Miyabe et Hemmi.—H. M. FITZPATRICK.
446. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. *Jour. Agric. Res.* 13: 437-450. Pl. 51-52. 1918.—A new species of *Actinomyces* isolated from sweet potato is named *A. poolensis*. It is apparently a wound parasite, and follows invasion by *Cystospora batata*, the parasitic slime mould described by Elliott. It is also pointed out here that *Acrocystis batatas* E. and Hals. is evidently identical with *Cystospora batata*; and the genus *Acrocystis* is stated to be invalid.—H. M. FITZPATRICK.

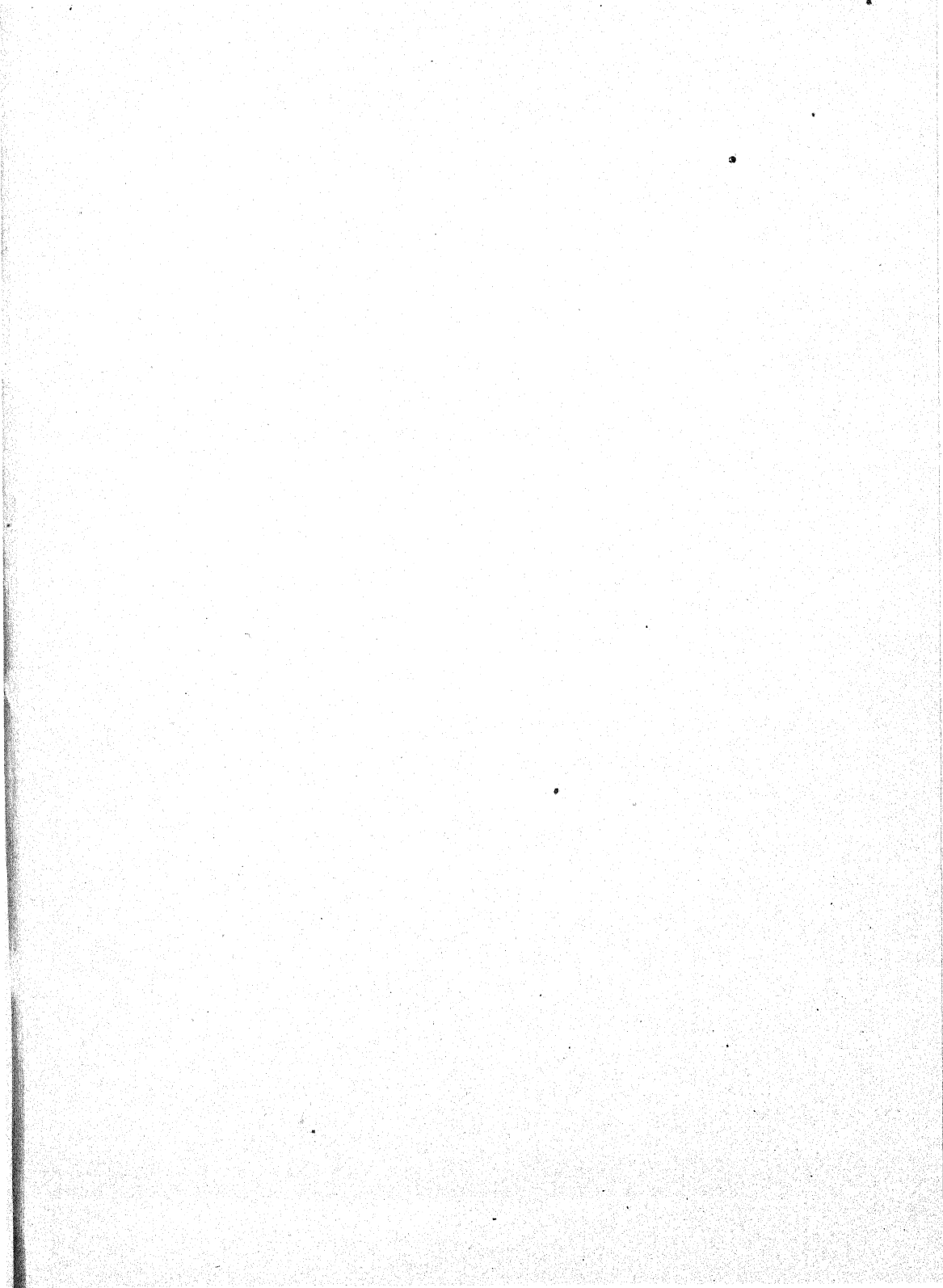
MYXOMYCETES

447. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. *Jour. Agric. Res.* 13: 437-450. Pl. 51-52. 1918.—See Entry 446.

448. Thomas, H. E., Cultures of *Aecidium tubulosum* and *A. passifloriicola*. *Phytopath.* 8: 163-164. 1918.—See Entry 373.
449. Weir, James R., Notes on the altitudinal range of forest fungi. *Mycologia* 10: 4-14. 1918.—See Entry 13.
450. Weir, James R., and Ernest E. Hubert, Cultures with *Melampsorae* on *Populus*. *Mycologia* 10: 194-198. 1918.—It is shown that the two rusts heretofore distinguished as *Melampsora medusae* and *M. albertensis* will each infect both *Pseudotsuga* and *Larix*, and in the absence of sharp differential morphological characters they are regarded as identical, i.e., *M. medusae*. *Larix lyalli* and *Pseudotsuga macrocarpa* are given as new hosts for this species.—H. M. FITZPATRICK.
451. Weir, James R., and Ernest E. Hubert, *Cronartium coleosporioides* on *Pedicularis groenlandica*. *Phytopath.* 8: 63. 1918.—See Entry 152.
452. Weir, James R., and Ernest E. Hubert, A note on *Hyalopsorae*. *Phytopath.* 8: 37-38. 1918.—See Entry 150.
453. Weir, James R., and Ernest E. Hubert, Notes on forest tree rusts. *Phytopath.* 8: 114-118. 1918.—See Entry 153.
454. Whetzel, H. H., The *Botrytis* blight of golden seal. *Phytopath.* 8: 75-76. 1918.—The host is *Hydrastis canadensis*. The fungus is a member of the sub-division *Microsclerotiae* of the genus *Botrytis*, and has been found on diseased plants in Wisconsin, Michigan and New York.—H. M. FITZPATRICK.
455. Wilson, Guy West., Rusts of Hamilton and Marion counties, Indiana II. *Proc. Indiana Acad. Sci.* 1916: 382-383. 1917.—Includes notes on five species of *Uredinales*, three of which are previously unrecorded from the area covered. (Supplementary to Wilson, G. W., Rusts of Hamilton and Marion counties, Indiana. *Proc. Indiana Acad. Sci.* 1905: 177-182. 1906).—H. S. JACKSON.
456. Wilson, Guy West., Studies in North American *Peronosporales*—VII. New and noteworthy species. *Mycologia* 10: 168-169. 1918.—*Peronospora grisea* Unger found near Carmel, Indiana, on *Veronica arvensis* and *V. peregrina*; *Peronospora Seymourii* Burrill collected on *Houstonia minor* at Iowa City, Iowa, believed to be the third collection; *Rhysotheca* (*Plasmopara*) *Acalyphae* sp. nov. on *Acalypha virginica* at Madison, Wisconsin by T. T. Davis.—H. M. FITZPATRICK.
457. Wolf, Frederick A., and E. E. Stanford, A *Macrophoma* disease of figs. *Phytopath.* 8: 24-27. *Fig. 1-2*. 1918.—The organism is believed to be identical with *Macrophoma Fici* Alm. & S. Cam. Material from North Carolina is compared with collections from Texas and Africa. The conidia are extremely variable in size and form, and are not infrequently 1-2-septate.—H. M. FITZPATRICK.
458. Zeller, Sanford M., An interesting fungus from Friday Harbor, Washington. *Pub. Puget Sound Biol. Sta.* 2: 95-96. 1918.—Locality and description of *Rhizopogon diplophloeus* Zeller & Dodge.—T. C. FRYE.
459. Zeller, S. M., and C. W. Dodge, *Gautieria* in North America. *Ann. Missouri Bot. Gard.* 5: 133-142. *Pl. 9*. 1918.—The authors give a list, with key, of species (five in number) of the genus known to occur in North America; descriptions, synonymy, references to illustrations, information as to distribution, and critical notes accompany the species. *Gautieria villosa* Quelet is placed in synonymy under *G. morchelliformis* Vittadini. *G. plumbea* is described as new. *Chamonixia caespitosa* Rolland is included under the extra-limital and

doubtful species, and while the authors suspect that the species belongs to *Gautieria* they do not make the transfer; under the same heading critical notes are given for two additional species of *Gautieria*.

460. Zimm, L. A., A wilt disease of maples. *Phytopath.* 8: 80-81. 1918.—A species of *Verticillium*.—H. M. FITZPATRICK.



BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for the remainder of volume 1 and also for the first issue of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Other changes will be reserved till the end of the present volume. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief.

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BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. I

NOVEMBER, 1918

No. 3

ENTRIES 461-813

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

[Unsigned abstracts are by the editor.]

461. [ANON.] The reconstruction of elementary botanical teaching. The examination of a witness. *New Phytol.* 17: 3-8. 1918.—This and three following communications are discussions of a memorandum under the same general title published by F. F. Blackman, V. H. Blackman, Frederick Keeble, F. W. Oliver, and A. G. Tansley, during the previous month (*New Phytol.* 16: 241-252. 1917.) The anonymous "witness" casts his discussion in the form of an examination by the five authors of the memorandum. He believes that the study of comparative morphology may be made to awaken the student's interest and stimulate his reasoning powers and imagination, and that it provides a solid foundation for work in physiology and applied botany; that ecology cannot profitably be included, except in the most general way, in an elementary course. Rigidity is to be avoided, and a teacher's own interests may suggest the lines on which his teaching may be made inspiring.—*Hazen.*

462. HILL, T. G. [Same general title as Entry 461.] Some practical suggestions. *New Phytol.* 17: 9-12. 1918. The grouping of other subjects to be studied with botany is discussed. The staff of each department of botany should include a chemist and a physicist. The student in physiology should be taught in such a way as to understand and be able to devise apparatus for particular experiments. Practical examinations are advocated.—*Hazen.*

463. JEFFREYS, HAROLD. [Same general title as preceding.] Ecology as a subject for teaching. *New Phytol.* 17: 51-53. 1918. This letter deprecates the inclusion of ecology in an elementary course, on the grounds that ecological research has not advanced sufficiently far to give the subject disciplinary value, and that the descriptive or informational part cannot profitably be studied without extensive preliminary field training, involving at least two summers. An editorial note (by A. G. Tansley) disclaims any intention of the Memorandum to include ecology "as a set subject in an elementary course," but maintains that ecology contributes essential material for the presentation of the conception of plants as living organisms.—*Hazen.*

464. McLEAN, R. C. [Same general title as Entry 461.] A plea for freedom. *New Phytol.* 17: 54-56. 1918. The writer objects to the Memorandum as revolutionary and oppressive, and maintains the opinion that students may be more easily interested in morphology than in physiology.—*Hazen.*

465. BIGELOW, MAURICE H. Contributions of zoology to human welfare. *Science* 48: 1-5. July, 1918. Emphasizes contributions to human welfare which biology may make through an education aiming to extend scientific knowledge to everybody, as contrasted with contributions through research and application of knowledge to physical human welfare; includes contributions to (1) intellectual life, and (2) eugenics. Author believes that no phase of biology which has purely physical applications to human welfare, such as bacteria and disease, or biology applied to agriculture, is more important for the *average* educated citizen than a general understanding of the evolutionary theory; hence he urges that our conception of applied biology for general education must be large enough to include intellectual as well as more directly practical aspects which affect human welfare economically and hygienically. Applied biology should be understood in a broad sense as meaning a selection, from the vast field of biological learning, of those facts and ideas which are likely to mean most in the life of the average educated man or woman. He urges an educational movement for eugenics based on a knowledge of biology, not through schools and colleges only, but through lectures, magazines, newspapers, and posters.

466. KIRKWOOD, J. E. The practical in education. Reprint from Inter-Mountain Educator. Jan., 1918. Paper read before Higher Education Section, Montana State Teachers' Assoc. Our most practical subjects are not always those most obviously applicable to economic problems, but those which pertain to the outlook upon life, and cultivate a truer perspective and a better sense of relative values. Illustrations from the field of botany.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

467. CONARD, H. S. Tree growth in the vicinity of Grinnell, Iowa. *Jour. Forestry* 16: 100-106. Jan., 1918.—In presenting data upon tree growth in the vicinity of Grinnell, Iowa, several facts are brought out in addition to noting the average annual growth increments of several species. There seems to be conclusive evidence that trees are encroaching upon the grasslands, and this is ascribed to the elimination of prairie fires during the past half-century. While this accounts for the present increase of forested areas it is not regarded as explaining the presence of grasslands, which constituted the natural vegetation upon the best soils in the region. The richer soils are very favorable to tree growth and the growth increments are sufficiently large to indicate that timber would prove a profitable crop. Some typical average annual increments are *Carya ovata*, 0.22 inch; *Quercus macrocarpa*, 0.30 inch; *Q. velutina*, 0.29 inch; *Acer saccharinum*, 0.63 inch and *Juglans nigra*, 0.34 inch. [Rev. by Fuller in *Bot. Gaz.* 66: 542-543. 1918.]—Geo. D. Fuller.

468. EVANS, I. B. POLE. The plant geography of South Africa. Dept. Agric. Union of South Africa. Official Year Book. 1917. 8 p. 24 pls. 1 map. 1918.—The very diverse vegetational types of South Africa are classified and mapped, in such a manner as to give an idea of the ecological divisions of the southern part of that continent. The woodland is subdivided into forest, scrub, bushveld and palmveld. The first of these, which is mostly evergreen, is dominated by species of *Podocarpus*, while the scrub is a type of sclerophyllous shrub, in which the *Proteaceae*, *Ericaceae* and *Restionaceae* contribute the dominant forms. From this the bushveld differs in its deciduous character and also in its more park-like aspect and its floristic composition. Bushveld is widely distributed and, while dominated by *Acacia* spp., such genera as *Tamarix*, *Combretum*, *Ficus*, *Zizyphus* and *Rhus* are of common occurrence. The palm belt comprises a littoral strip on the southeast, in which palms (as *Mimosa cappa* and *Phoenix reclinata*, *Raphia vinifera* and *Cocos nucifera*) mingle with succulents from the genera *Aloe* and *Euphorbia*.—The grasslands cover the larger portion of the country, with transitions to scrub and desert. That of the Kalahari region occupies much of the central portion of South Africa, with an open formation of short, low, wiry grasses (such as *Aristida* and *Eragrostis*), occurring in isolated tufts. This and the other grasslands show

transitions to the desert towards the west.—Four distinct desert types are briefly characterized and mapped, perhaps the most remarkable being the southern portion, the vast shallow basin of the Karroo, sparsely populated by succulent, tuberous and bulbous plants. Prominent genera are *Crassula*, *Mesembryanthemum*, *Cotyledon*, *Euphorbia*, *Aloe*, *Stapelia*, *Senecio*, *Encephalartos* and *Euclea*. The paper contains excellent plates which enable one to visualize the different types, and a map showing their distribution. [Rev. by Shreve in *Plant World* 21: 160. 1918. Also rev. by Fuller in *Bot. Gaz.* 66: 539. 1918. Also unsigned rev. in *Nature* 101: 509. 1918.]—*Geo. D. Fuller.*

469. FERNALD, M. L. The contrast in the floras of eastern and western Newfoundland. *Amer. Jour. Bot.* 5: 237-247. 3 pls. May, 1918.—In contrasting the divergent floras of different parts of Newfoundland, Fernald bases his explanation of their differences upon the hypothesis that "the presence or absence of varying degrees of available lime or of other bases in the soil is more fundamental in determining plant distribution than are even considerable differences of temperature and humidity."—The most calcareous and at the same time the most fertile portion of the island is along the west shore, where the ordinary observer would be surprised to find the indigenous flora of the warmest and most mesophytic region of the island, composed very largely of species of far northern distribution, such as *Juncus triglumis*, *Saxifraga oppositifolia*, *S. aizoides*, *S. caespitosa*, *Salix vestita*, *Dryas integrifolia* and *Lesquerella arctica*. These Fernald explains as being from the calcareous habitats of the arctic archipelago and the Canadian Rockies, the lime being hostile to the plants of the adjacent siliceous mainland.—The eastern part of the island, the central tundra district, and the southwest corner, in spite of the fact that these regions are cold, bleak and barren, are populated mainly by plants of the southern Atlantic coast region, with an addition of some like *Calluna vulgaris* and *Pedicularis sylvatica*, from the acid soils of western Europe.—Maps of the distribution of a dozen species give graphic demonstration of the remarkable distribution of some of the more important plants. [Rev. by Fuller in *Bot. Gaz.* 67: 101. 1919.]—*Geo. D. Fuller.*

470. HESSELBO, AUG. The Bryophyta of Iceland. In: ROSENVINGE, L. K., and EUG. WARMING. The botany of Iceland. 1²: 397-676. 39 fig. 1918.—This is a rather complete account of the bryophytes of the island of Iceland. His annotated list shows 93 species of Hepaticae, 20 of Sphagnales and 325 of Musci. These he further discusses as to their aggregation in communities and their altitudinal and horizontal distribution. [Full rev. by A. Gepp in *Jour. Bot.* 56: 277-279. 1918. Unsigned rev. in *Nature* 102: 44-45. 1918. Abst. by Fuller in *Bot. Gaz.* 67: 104. 1919.]—*Geo. D. Fuller.*

471. HOWE, C. D. Forest regeneration on certain cut-over pulpwood lands in Quebec. *Commis. Conservation Canada, Ann. Rep.* 9: 1-15. 1918.—The problems of the regeneration of certain pulpwood forests are discussed. Author finds that, under the usual conditions of cutting, the mixed conifer and hardwood forests of the lower St. Maurice valley are replaced by pure hardwood stands of little value for pulpwood. He deplores the lack of experimental data for the establishment of a system of management which would result in the increased production of the valuable spruce. [Abst. in *Exp. Sta. Rec.* 39: 145. 1918.]—*Geo. D. Fuller.*

472. OSTRUP, ERNST. Marine diatoms from the coasts of Iceland. In: ROSENVINGE, L. K., and EUG. WARMING, The botany of Iceland. 1²: 347-394. Pl. 1. Copenhagen, 1918.—As a contribution to the botany of Iceland are listed 209 species of marine diatoms collected off the coasts of the island. Of these, about 5 represent new species. Tabular arrangements show distribution, both near the Iceland coast and elsewhere. It is shown that this portion of the coastal flora has strong European affinities. Tables also show the forms characteristically associated with other marine algae and the forms characteristic of different months of the year.—*Geo. D. Fuller.*

473. SKOTTSBERG, CARL. The islands of Juan Fernandez. *Geog. Rev.* 5: 362-383. 20 fig. May, 1918.—This paper gives an account of a visit to the islands of Juan Fernandez to study

their peculiar flora. Technical report is promised as soon as material collected has been worked over; in the meantime attention is called to the large number of endemic species; mention is made of *Lactoris fernandeziana*, a relative of the magnolias, constituting a monotypic endemic family. Also, the general character of the forest is sketched; it is of the evergreen rain-forest type, similar to that of southern Chile, and contains some Chilean species although dominated by endemics, among which species of *Myrceugenia* and the monotypic palm, *Juanita australis*, are conspicuous. Ferns are abundant, ranging from the large tree type to the minute *Hymenophylla*.—The endemics mentioned include many miniature tree forms belonging to the composite family, and *Gunnera Mas-afueræ*, with leaves ten feet across. [Rev. in Plant World 21: 161-162. 1918.]—Geo. D. Fuller.

GENETICS

GEO. H. SHULL. *Editor*

[Unsigned abstracts are by the editor.]

474. ANDÔ, H. Oomugi no iden ni kwansuru kenkyû. [Studies on inheritance in barley.] [In Japanese.] Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.] 22: 1-7. May, 1918.—Following observations are based on individuals derived from natural cross of Canadian race of two-ranked barley with hulled grains loosely arranged on spike. Author found as usual that two-ranked arrangement is dominant to six-ranked. In F_2 the ratio of the two kinds of individuals is 2.5 to 1 (4.3 : 1 according to Tschermak, and 3 : 1 according to Biffen). Author thinks that this ratio is not mere chance deviation from 3 : 1; he assumes one factor C , common to both, for development of the six-ranked arrangement, and two factors H_1 and H_2 , which, acting together in presence of C , inhibit development of side-rows of the spike, thus causing formation of two-ranked arrangement. He further supposes coupling of H_1 and H_2 according to gametic series 13:1:1:13, and thus explains above-stated ratio, 2.5 : 1. In plants derived from cross in question some have hulled, and others naked grains; again, in some they are loosely arranged on spike, while in others very compactly, hulled condition and loose arrangement being dominant to naked and compact ones, respectively. In F_2 of these dihybrids author did not find usual 9 : 3 : 3 : 1 ratio, but quite another 134 : 13 : 13 : 36. He explains this unusual ratio by supposing that factor A for hulled grains and L for loose arrangement are coupled together according to gametic series 6 : 1 : 1 : 6. Cross of two-ranked barley by six-ranked gave F_1 plants varying notably in respect to shape of side rows.—S. Ikeno.

475. COLE, LEON J. The application of genetics to breeding problems. School Sci. Math. 18: 447-454. 6 fig. May, 1918.—Science of breeding must consist of (1) analysis of hereditary factors involved and (2) manipulation of these in breeding to produce combinations which will give results as expressed in characters. Selection is basis on which all progress in breeding must be made, based on knowledge of factors in materials used. Deleterious effects of inbreeding explainable by theory of "vital" factors whose absence has "lethal" effect. By far greatest number of characters of commercial importance dependent on several to many factors. Such characters must be analyzed, their constituent factors identified and their mode of inheritance determined. Examples, milk and meat production in cattle and immunity to disease.—E. E. Barker.

476. CUTLER, D. W. On the sterility of hybrids between the pheasant and the gold campine fowl. Jour. Genetics 7: 155-165. 1 pl. May, 1918.—Spermatogenesis proceeds normally until synapsis, and stops here with formation of irregular chromatin masses. No females appeared, though a dozen males were secured. Possibility of pheasant spermatozoa forcing female-producing class of eggs to give rise to males is raised.—H. D. Goodale.

477. DE VRIES, HUGO. Van Amoëbe tot Mensch. From amoeba to man. 17 × 25 cm. 32 p. A. Oosthoek, Utrecht, 1918.—In this last lecture of De Vries at University of Amster-

dam, (delivered in Dutch and published in Dutch with complete English translation), he reviews briefly some lines of investigation on heredity and origin of species, emphasizing pangenesis conception of Darwin and himself, which asserts heredity is bound to material particles (gemmules or pangenes) actually transmitted in reproduction. Pangenes are located in chromosomes in definite arrangement as recently determined in *Drosophila*. Changing influence of these genes under changing environments gives fluctuating variability; appearance of new genes and inactivation or loss of existent genes gives mutational variability, one of main sources of new species and of progressive differentiation in time. Reversions give idea of active and inactive pangenes, latter not necessarily lost as Bateson asserted. Recommends polymorphic groups for observations on species formation; such are violets, roses, *Draba verna*, *Oenotheras*, etc. Progressive mutations are very rare but loss mutations relatively frequent. De Vries takes exception to authors like Davenport who deny progressive mutation and explain evolution by loss of genes from primitively complex conditions of germ plasm. Mutants *gigas*, *lata*, *scintillans*, considered progressive mutations, because of increase in chromosome number, but author recognizes that convincing criterium of such mutation is still wanting. Investigators of future must find laws of mutation in order that process may be controlled at will.—J. P. Kelly.

478. GATES, R. RUGGLES. A systematic analytical study of certain North American Con-vallariaceae considered in regard to their origin through discontinuous variation. Ann. Bot. 32: 253-257. April, 1918.—Résumé of a paper to appear after the war. Application of mutationist conceptions to systematic work, i.e., specific differences treated as definite and marked variations rather than as accumulation of small differences with later elimination of intermediates. Species of *Disporum* distinguished chiefly by presence and absence characters, such as may have arisen as single mutations, and only to minor extent by quantitative characters; *D. trachycarpum* has reticulated fruits while others have them smooth; *D. oregonum* has entire instead of the three-cleft stigma of eastern species; *D. Smithii* and *D. Hookeri* form pair differing respectively by white and green flowers, hairy and glabrous pistil, ciliate and non-ciliate leaf margins. Such differences are unlikely to be advantageous and seem result of sudden chance variation which heredity perpetuates and so gives new species; their comparative recency of origin are to be judged by relative areas occupied. Briefly considers also species of *Clintonia*, *Smilacina*, *Uvularia*, *Oakesia* and *Streptopus*.—J. P. Kelly.

479. GATES, R. RUGGLES. A systematic study of the North American Melanthaceae from the genetic standpoint. Jour. Linnean Soc. Bot. 44: 131-172. May, 1918.—Author applies to specific and generic differentiation of Melanthaceae the mutation conception of marked or discontinuous variation rather than exclusively the Darwinian conception of gradual differentiation of species. Author recognizes that continuous variations sometimes lead from species to species but claims such are as yet incompletely analyzed and significance unknown despite current belief that "fluctuations" are not inherited. Many cases of discontinuity due to extinction, but many more seem due to definite variation. Existence side by side of related genera with marked differences indicates latter to be not of selective value and mutation theory accounts for such. *Triantha* differs from *Tofieldia* partly in having rough pubescence and flowers in clusters of three instead of singly; this might have resulted from two mutations. *Pleia* is isolated and extinction must have occurred between it and nearest relatives. Filaments of *Nartheceum* bear dense wool probably of no service, originating probably through mutation, persisting through inheritance. Within genus *Nartheceum* specific differences are chiefly small, quantitative, of type which Darwin's theory postulates. *Amianthium*, *Xerophyllum*, and *Stenanthium* are essentially bitypic genera in which species differ largely in having broad or narrow leaves; this indicates possibility of tetraploid mutation or cell-gigantism. Fourteen other genera are listed and discussed.—J. P. Kelly.

480. HODGKINSON, EDITH E. Some experiments on the Rotifer Hydatina. Jour. Genetics 7: 187-192. May, 1918.—Observations were made on 42 families of rotifers, each containing

from 2-17 generations, in order to determine whether pure female-producing families or strains existed. Male-producing females, however, appeared in all of these families either in first or subsequent generations and conclusion was reached that pure female-producing families do not exist.

Rotifers kept in very strong solution of horse manure and fed colorless protozoa which grew in this solution yielded no male-producing females. Their repression was presumably due to influence of the strong horse manure solution. In other experiments rotifers were fed colorless protozoa that grew in the horse manure solution after they had been first thoroughly washed and freed from all of the solution. Very few male-producing females were produced from this feeding, although with removal of inhibiting influence of strong horse manure solution many male-producing females were expected.

In experiments extending through 15 generations in which rotifers were fed colorless protozoa in the horse manure solution about 6 per cent. of individuals were male-producing females, but when diet was changed to one of *Euglena* in water free from horse manure solution, percentage of male-producing females was changed from about 6 per cent. to about 71 per cent. This high percentage of male-producing females may have been caused: by stimulus of sudden change of diet; by removal of inhibiting influence of horse manure solution; by more oxygen in *Euglena* solution; or by food itself in *Euglena*.

Certain lots of rotifers fed on scanty diet of *Euglena* and other lots on copious diet of *Euglena* produced about 42 per cent. and about 51 per cent. of male-producing females, respectively. Whether this higher percentage of male-producing females was caused by an increased supply of oxygen or by more food was not determined.—D. D. Whitney.

481. HULL, J. E. Gynandry in Arachnida. Jour. Genetics 7: 171-181. 1 fig. May, 1918.—Author brings together eight cases of gynandry among spiders belonging to eight species and two families. Of these, one was observed and described by Hull himself, the others by various writers.—Cases most carefully described he divides into three classes: (1) One side male, other female,—sexual structures perfect except for distortion resulting from union of dissimilar halves on median line; (2) like 1, except that one side is imperfectly developed before, the other behind; (3) one side perfectly female before and male behind, the other perfectly male in front and female behind. To last class belongs example described by author. This displayed typical male characters on right side of cephalothorax, including its appendages, left side being female, while in genital region of abdomen, conditions were reversed.—F. B. Sumner.

482. ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Bot. 32: 279-317. April, 1918.—Author deals with gametophytes and fertilization in *Oe. nutans*, *Oe. pycnocarpa*, and their hybrids. Female gametophyte is tetranucleate. In four out of over 500 sections, particles resembling chondriosomes occurred in egg. Twin embryo sacs are common; nothing conclusive as to fate of second embryo sac. Persistency of more than one megaspore considered atavistic. Male nucleus had plasma sheath which is shed before fusion with egg. Occasional presence of more than two male nuclei in embryo sac; author records fusion of one egg with two male nuclei and refers to bearing of this on triploid mutants. *Oe. nutella*, one of the two hybrids between *nutans* and *pycnocarpa*, was self-sterile owing to sluggish growth of pollen tube. [This is repeatedly printed *Oe. nutanella*.]—J. P. Kelly.

483. LAUGHLIN, H. H. Modifications of the 9:3:3:1 ratio. Amer. Nat. 52: 353-364. June-July, 1918.—Accompanying figures describe experiments chemically paralleling what must happen when F_1 genes develop traits in F_2 somas, in each case of modified somatic dihybrid ratio. Each drawing represents wooden block with holes for holding test-tubes, arranged after manner of Punnett checker-board scheme for illustrating recombination of F_1 gametes into F_2 zygotes. Suitable chemicals are designated for filling gamete-representing tubes, also resulting colors produced when they mix in zygote-representing tubes. All specifications are given for sizes, quantities, etc. for each modified ratio. Section A

presents 10 different di-hybrid ratios which may occur when dominance is complete and segregation normal and independent. Section B illustrates F_2 di-hybrid phenotypic ratio 1:2:1:2:4:2:1:2:1, involving normal segregation with somatic blending, as assumed by Davenport for inheritance of skin color in Negro-White crosses. Section C deals with combination of complete dominance in one factor and blending in other, giving ratio 3:6:3:1:2:1. Author suggests that genes in gametes might be better represented in solid form by chemicals in capsules which slowly dissolve in substratum of zygote.—E. E. Barker.

484. LINDSTROM, E. W. Chlorophyll inheritance in maize. Mem. Cornell Univ. Agric. Exp. Sta. 13. 23 × 16 cm., 68 p., 5 colored pl. Cornell University, Ithaca, N. Y. Aug., 1918.—Author reports six chlorophyll characters of maize. all simple recessives to normal green, crosses of any two giving green F_1 . Two seedling (white, *w*, and virescent white, *v*) and four mature-plant characters (golden, *g*, green striped, *st*, *japonica* striped, *j*, fine striped, *f*). Virescent white changed to yellow and white striped *japonica* to yellow striped in presence of *l*. Aleurone color factor *R* represses *japonica* striping, *r* allowing full development. Normal green is *W V G St J F* and *L* or *l*. Independent Mendelian inheritance with 9:3:3:1 F_2 results from green F_1 *Gg Stst*, and apparently from *Gg Jj*, *Gg Ff*, *Jj Stst*, *Jj Ff*, *St St Vv*; 9:3:4 F_2 from *Wv Vv*; 12:3:1 F_2 from *Vv Ll*. Linkage of *Gg* with *Ll*, 19 per cent crossing over; *Gg* with *Rr*, 23 per cent crossing over; *Ll* with *Rr*, no crossing over, regarded as completely linked rather than allelomorphic. Spotting is recessive or partially dominant, mode of inheritance not fully understood.—R. A. Emerson.

485. LIPPINCOTT, WILLIAM A. The factors for yellow in mice and notch in *Drosophila*. Amer. Nat. 52: 364-365. June-July, 1918.—Author maintains that the two cases named may be due either to two separate but closely linked genes, one producing the observed somatic effect, the other being a recessive lethal; or to a single gene that produces both effects. He thinks question may be decided by attempting to separate the somatic effects from possibly accompanying lethals by crossing over.—A. H. Sturtevant.

486. MIYAZAWA, B. Asagao ni okeru ha no iro to hana no iro to no iden. [Inheritance of leaf-color and flower-color in the Japanese morning-glory.] [In Japanese.], Nôgakukwai Kwaihô. [Report Agron. Soc.] 190: 603-638. June, 1918.—Parents used in hybridization were yellow-leaved (*chlorina*) plants with white flowers and green-leaved ones with flowers of peculiar red color distinguished by its darkness ("kaki-color" in Japanese, very common in flowers of Japanese morning-glory). All F_1 plants made in either reciprocal way are green-leaved and bear flowers of bluish red color, quite a different color from either parent. In F_2 author confirms observations of Takezaki (Bot. Absts. 1, Entry 502), that green and yellow-leaved plants occur in ratio 3:1. Flower color in F_2 was very various, the dark red ("kaki") color is found exclusively in flowers of green-leaved plants and never on yellow-leaved ones, though green-leaved plants do not necessarily bear dark-red flowers, suggesting possible linkage (either coupling or repulsion) between color characters of leaves and of flowers. Author shows however that if flowers are distinguished simply into colored and white ones, green-leaved and yellow-leaved plants segregate, each into 3 colored and 1 white, respectively, giving in F_2 , green colored, green white, yellow colored, and yellow white, in usual di-hybrid ratio 9:3:3:1. Author denotes green-leaved parent with dark red flowers by the formula *GGKK* (*G*, green leaf-color; *K*, dark red flower color), and consequently yellow-leaved parent with white flowers by *ggkk*. He thinks that *K* is able to produce dark red flower-color, only when the accompanying *G* is in homozygous condition, but produces ordinary red color when *G* is either entirely absent or in heterozygous condition. Author has confirmed this hypothesis by culture experiments extending to F_3 and also by back-crossing. For instance, F_1 plants have no dark red flowers in spite of their green leaves, because *G* is then in heterozygous condition, i.e., *GgKk*. Other examples of relation between flower color and leaf color are as follows: *GGKk*, green and dark red; *GgKK*, green and ordinary red; *GGkk*, green and white; *ggKK*, yellow and red.—S. Ikeno.

487. MORGAN, T. H. Concerning the mutation theory. *Sci. Monthly* 5: 385-405. May, 1918.—The criticism that mutation theory does not explain evolutionary progress which is apparently continuous is shown to be based on misconception that mutations are necessarily "large" steps. Difference in genetic behavior between usual type of mutation and type originally described for *Oenothera* seems largely explained by hypothesis of "balanced lethals," which accounts for permanent heterozygosis, for certain small classes simulating mutations, and for twin or multiple hybrids in F₁. Examination of nature of gene as unit of mutation shows that objections to such units furnishing materials of evolution are invalid. A mutant species idea is gaining ground over strict unit character idea because of accumulating evidence of manifold effects of single mutant genes.—C. B. Bridges.

488. MORGAN, T. H. Changes in factors through selection. *Sci. Monthly* 5: 549-559. June, 1918.—Significance for the selection theory, of class of mutations known as "specific modifiers," is emphasized. Three criteria by means of which presence of such modifiers can be made probable, and fourth method by which their presence can be demonstrated, are described and illustrated. Proof that certain series of multiple allelomorphs are not examples of close linkage is derived from knowledge of origins of the different allelomorphs. Possible relations of multiple allelomorphs to selection are examined. Implication sometimes made that selection may determine order of appearance of allelomorphs is shown to be groundless.—T. H. Morgan.

489. MORGAN, T. H. Evolution by mutation. *Sci. Monthly* 5: 46-53. July, 1918.—Each species is conceived to be product of definite set of co-acting genes which have their present effect as result of series of mutative processes. Relationship between different species is an expression of relatively large number of genes possessed in common. Evidence is fast accumulating that common genes probably undergo analogous mutation in related species, the direction being conditioned by physico-chemical constitution of the gene and not by some hypothetical "directive force." Mutations furnish natural selection with its working material, relatively few producing characters better adapted to available environments than original characters. Bulk of successful mutations are not improbably those of slight somatic effect so that evolution of characters frequently appears continuous.—C. B. Bridges.

490. NEWMAN, H. H. Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids. *Jour. Exp. Zool.* 26: 391-421. 2 pl. Aug., 1918.—In Echinoids, inseminations of eggs with sperm of other orders, classes, and even phyla, may be accomplished by chemical means, but no real fertilization reactions occur. Actual hybridization is restricted to species within the order Diademoida. Also in fish, hybridization is restricted, so far as known, within one order, the Teleostei. Artificial aid is unnecessary in crossing practically all Teleosts. *Fundulus heteroclitus* and *Scomber scombrus* were chosen because the differentiating characters of the larval stages, red chromatophores of *Fundulus* and green ones of *Scomber*, adapt this cross to demonstrate facts about heterogenic hybridization. Study of heredity is limited to cross of *Fundulus* ♀ and *Scomber* ♂ as all stages to hatched larvae are obtained, while embryos produced by reciprocal die before, or during, gastrulation. Paternal heredity is made obvious by appearance of green chromatophores in hybrid larvae. Hybrids subnormal with respect to apical structures (eyes, heart, etc.), predominate. The more pronounced the abnormality, the greater number of paternal chromatophores present. Conclusion seems justifiable that "in proportion as the paternal element vigorously exercises its functions, in like proportion is development retarded and the various types of monster appear." Most successful embryos are without paternal chromatophores; not result of parthenogenesis, but recovery from disharmonious paternal influence which generally retards development. Large number of eye and heart abnormalities is due to differential inhibition, effect of which, according to Child's "axial gradient" hypothesis, is to induce more abnormalities in apical than in basal parts of embryos. Differential recovery is indicated by occasionally finding embryos with enlarged apical and reduced basal parts, and even isolated eyes and hearts, with rest of egg undifferentiated. These embryos

are usually without paternal chromatophores at least in region of differentiation. These are considered as "differential recovery products," occurring only after prolonged inhibition. Heterogenic hybrids are subnormal, due to active functioning of disharmonious paternal materials. These materials must be eliminated or neutralized in order that proper structural differentiation may result. [Abst. in *Physiol. Absts.* 3: 457, 458. Nov.-Dec., 1918.]—*R. K. Nabours.*

491. NOHARA, S. Endô no keisitu iden ni tuite. [On the inheritance of certain characters in the pea.] [In Japanese.] Nippon Ikusyugakukwai Kwaihō. [Rep. Jap. Assoc. Breeding Sci.] 22: 12-14. May, 1918.—Genetic studies in some characters in *Pisum*. Bot. Mag., Tôkyô, 32: 91-102. 2 fig. May, 1918.—Hybridization of Japanese race of white pea (Japanese name "Siroendo") and French "Sans parchemin très large cosse" (de Vilmorin), both of which produce soft edible pods, has given rise in both reciprocal crosses, to plants with hard inedible pods, hardness being due to the development of parchment-like tissue. Author compares this with production of purple-flowering sweet peas from two white-flowering plants, and thinks that inedible pods are due to meeting of complementary factors *L* and *D*, one of which was present in either parent. This supposition was confirmed by F_2 generation, which contained plants in ratio 9 hard : 7 soft, and further proved by F_3 generation. How these two complementary factors differ from each other is yet unknown.—*S. Ikeno.*

492. PUNNETT, R. C., AND THE LATE MAJOR P. G. BAILEY. Genetic studies in poultry. 1. Inheritance of leg-feathering. Jour. Genetics 7: 203-213. May, 1918.—Crosses were made of Langshan males on Brown Leghorn females and of Hamburg males on Langshan females. Langshans have moderately-feathered shanks, the others are clean-shanked. Feathered shanks are incompletely dominant in F_1 . The partial dominance is referred to modifying factors. Ratios in F_2 and various back-matings indicate that feathered shanks are due to single Mendelian factor. In order to bring observations of other workers into line, it is suggested that some booted races may have two factors for feathered shanks while some clean-shanked races may have an inhibitor.—*H. D. Goodale.*

493. RAYNER, M. C. Notes on the genetics of *Teucrium scorodonia crispum* (Stansfield). Jour. Genetics 7: 183-186. 1 pl. May, 1918.—Preliminary note is given of the results obtained in crossing "wood-sage" variety *Teucrium scorodonia crispum* (Stansfield) which is characterized by "crisped" or "crested" leaves, with wild plants of *T. scorodonia*. Plants of *T. scorodonia crispum* used in crossing are vegetative descendants of wild plants found at least 50 years ago and have shown no tendency to revert to normal type. They bear normal flowers and viable seed and produce self-sown seedlings with normal foliage. F_1 plants gave no indication of their hybrid origin. Selfed F_1 plants gave 200 seeds which produced 89 plants with no trace of "cresting." F_1 plants crossed with "crested" grandparent, using latter as pollen parent gave 12 seeds which failed to germinate. Author suggests that seeds carrying "crested" characters may be either non-viable or that seedlings died soon after germination. Experiments must be repeated and extended before correct hypothesis can be founded.—*Richard Wellington.*

494. RICHARDSON, C. W. A further note on the genetics of *Fragaria*. Jour. Genetics 7: 167-170. May, 1918.—Pink-flowering *F. vesca* \times white gave approximately 15 : 1 ratio in second generation. Reciprocal crosses between single and double *vescas* produced in F_2 3 : 1, likewise cross "hairy" stems \times not hairy.

Evidence presented on sex inheritance showing female dominance. Ratio 9 : 7 resulted by placing sterile flowers with sex to which they appeared to belong, and hermaphrodites and males together. 200 F_1 plants (*virginiana* \times *vesca*) flowering in open, gave 4 females and 3 hermaphrodites setting one or two seeds on each plant. Respective crosses *vesca* \times *Daltoniana* and *vesca* \times *chiloensis* yielded no free-fruited plants.—*R. J. Garber.*

495. RICKARDS, ESTHER, AND F. WOOD JONES. On abnormal sexual characters in twin goats. Jour. Anat. 52: 265-275. April, 1918.—Examination of twin goats having at first the appearance of females but later developing masculine characteristics showed both to be abnormal in that both male and female structures were present in reproductive system. Gross anatomical and microscopic studies were made of organs, drawings of which are presented. Author believes origin of these twins to be monozygotic; that Lillie's theory that abnormally sexed individual is produced by action of sexual hormones developed by other twin is disproved; and that these animals were males, "the external genitalia of which are incompletely masculine at birth, and in which also the usual rudiments of the female internal genitalia are altogether unduly developed." Male gonad is late in exerting its influence, thus producing such abnormal individuals.—*Elmer Roberts.*

496. ROBBINS, RAINARD B. Partial self-fertilization contrasted with brother and sister mating. Jour. Genetics 7: 199-202. May, 1918.—A. B. Bruce stated in earlier paper that "for simple cases it will be found if individual matings are worked out in detail that any such hypothesis as continued brother and sister mating, or continued mating of first cousins, can be expressed in terms of a fixed proportion of selfed individuals to individuals mated at random," and assumed this to be a general truth. Author demonstrates that such general assumption is erroneous, for the heterozygous type tends to disappear in continued brother and sister mating, but in a combination of self-fertilization and random breeding the heterozygous type can never disappear. Hence no combination of random mating and self-fertilization can represent continued brother and sister mating.—*J. Detlefsen.*

497. ROBERTS, ELMER. Correlation between the percentage of fat in cow's milk and the yield. Jour. Agric. Res. 14: 67-96. 2 fig. July, 1918.—Generally accepted that low-yielding cows produce higher percentage fat than do high-yielding cows, though not previously demonstrated by statistical investigation. Wilson suggested independence of yield of milk and percentage of fat, but did not arrange data to bring out relationship. Author's data furnished by registers of American associations and involve study of many individuals of principal breeds. Yearly tests were made from selected individuals, and relation between yield of milk and percentage of fat found by means of correlation tables. Extensive data included in tables A-H and correlation tables I-XXI are for Jerseys, Guernseys, Holstein-Friesians, Ayrshires, grade Jerseys, grade Holstein-Friesians, and some unclassified. Conclusions: Significant correlation between percentage of fat and yield in all except Ayrshires, in which it is significant only when groups are treated. Yield of milk increases with age, though may decrease at some time beyond five years. Percentage fat in Jerseys, Guernseys, and Holstein-Friesians remains fairly constant for ages studied. Variation of percentage butter fat not influenced by age according to standard deviation. On same basis breed has influence on variation of milk yield and percentage of fat. For variability in yield, breeds stand in ascending scale: Jersey, Ayrshire and Guernsey practically together, Holstein-Friesian. For percentage of fat: Holstein-Friesian and Ayrshire about the same, Guernsey, Jersey.—*R. K. Nabours.*

498. SAUNDERS, EDITH R. On the occurrence, behavior and origin of a smooth-stemmed form of the common foxglove (*Digitalis purpurea*). Jour. Genetics 7: 215-228. May, 1918.—Common foxglove (*Digitalis purpurea*) has two distinct forms, *pubescens* and *nudicaulis*, the former being more common. *Nudicaulis* is often found growing with *pubescens* but there is no record of its being found alone. The two forms are alike in all respects except as to surface character; *pubescens* possessing stem gray and densely pubescent throughout and leaves very hairy; *nudicaulis* with stem green, polished and smooth from base to flowering region, where it becomes pubescent, the leaves being less hairy than in *pubescens*. The distinguishing feature of *nudicaulis* is a character common to several other species within the genus, examples of which are given by the author. Both forms are equally fertile, setting seed abundantly and both, when pure, breed true. The origin of *nudicaulis* may be explained on one of the following hypotheses: (1) It may be hybrid—but this is doubtful since F₁

hybrids between the two forms, when selfed, yield 3:1 ratio with *nudicaulis* dominant. F₁ hybrids bred back to recessive yield 1:1 ratio. (2) The two forms may have had parallel development from common ancestor. (3) *Nudicaulis* may be mutant from *pubescens*—but it is unlikely that dominant mutant should be derived from recessive type. (4) *Pubescens* may be (though more common in occurrence) recessive mutant from *nudicaulis*. According to accepted view we have in *Linaria alpina* similarly, the type in recessive spotted form, and variety in dominant *concolor*. Author found in studying certain abnormal features (1) that peloria and heptandry (two modifications of corolla, both recessive to normal) are inherited independently and (2) that margins of sepals may rarely be thickened and bear structures having appearance of rudimentary ovules.—M. N. Pope.

499. SAX, KARL. The behavior of the chromosomes in fertilization. *Genetics* 3: 309-327. 2 pl. July, 1918.—Description with illustrations of stages in first division of fertilized egg in *Fritillaria pudica* and *Triticum durum hordeiforme*. In *Fritillaria* no continuous spireme was demonstrable. 12 chromosomes from each parent split longitudinally and 24 chromosomes proceed to each pole. In lower polar nucleus chromosomes become doubled in number, resulting in primary endosperm nucleus with 4x chromosomes, 3x maternal and 1x paternal. No evidence that maternal and paternal chromosome groups remain distinct even in first division. In *Triticum* separate spiremes are formed by egg and sperm nuclei after latter enters egg. About 14 chromosomes from each split longitudinally, 28 going to each pole. In triple fusion each nucleus contributes 14 chromosomes, and there is evidence that the contributions from the several nuclei may remain more or less separate even in metaphase of first division. In both species first division of zygote is like any other somatic mitosis, and in triple fusion neither shows pairing of chromosomes, and first and following divisions appear to be regular. Author points out that telosynapsis would present difficulties for hypothesis of linear arrangement of genetic factors. He finds no evidence of cytological basis for somatic segregations.

500. STAKMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? *Jour. Agric. Res.* 14: 111-124. 5 pl. July, 1918.—Barley, which is moderately susceptible, and susceptible varieties of wheat, did not change parasitic capabilities of *Puccinia graminis tritici-compacti* so that it attacks a normally resistant wheat. Continued association with resistant wheat did not cause the rust to attack this wheat more virulently.

P. graminis tritici was used to determine the action of hybrids as bridging forms. Infection capabilities of this rust were not changed on either resistant or susceptible parents after growth on susceptible F₁, F₂ or F₃ hybrid plants.

Bobs, which Pole Evans found immune to stem rust in South Africa was found to be susceptible. Resistance of wheats may vary in different regions because of presence of different biologic forms of rust.—H. K. Hayes.

501. STOCKARD, CHARLES R., AND GEO. N. PAPANICOLAOU. Further studies on the modification of the germ-cells in mammals; the effect of alcohol on treated guinea-pigs and their descendants. *Jour. Exp. Zool.* 26: 119-226. May, 1918.—Data are given on 1170 animals, of which about 900 belong to alcoholic lines (600 with practically no inbreeding, 300 more or less inbred) and rest are controls. The alcoholic lines include immediate and more remote descendants of animals treated by inhaling alcohol fumes. Direct effects of such treatment on subjects was practically nil, but alcoholic lines were inferior to control lines for average size of litter was smaller, conception failed more frequently, early and late prenatal death rates were high, abnormalities were much more frequent, and surviving offspring were smaller and grew more slowly. Mortality in alcoholic lines was high largely because elimination occurred by absorption and abortion of embryos and fetuses. Elimination is thus selective. Progeny closely related to treated stock were inferior but later descendants further removed from treated ancestors are progressively improved. Treating male ancestors for one and two generations as compared with similar treatment of female

ancestors showed worse results in the latter case, presumably because alcohol acted on developing embryos as well as on germ-plasm. Peculiar sex-ratios occurred, suggesting in part differential sex mortalities during early prenatal life, but the case is not entirely clear.—*J. A. Dellefsen.*

502. TAKEZAKI, Y. Asagao no iden II. [Inheritance in the Japanese morning-glory.] [In Japanese]. Nippon Ikusyugakukwai Kwaihō. [Rep. Jap. Assoc. Breeding Sci.]. 22: 7-11. May, 1918.—From ancient times it has been very well known among Japanese gardeners that some strains of Japanese morning-glory (*Ipomoea*) behave like some strains of *Matthiola* or *Petunia*, in that they always segregate into plants with single flowers and those with fully double ones, the latter being completely sterile. Author finds ratio of these two kinds of plants produced by self-fertilization of such a strain of the Japanese morning-glory, is 3 : 1. Hybridization of plants with single flowers derived from this partially double-flowering strain, with plants of the ordinary single-flowering strains, give rise to F_1 plants, all with single flowers. Offspring of some F_1 plants bear exclusively single flowers, while progenies of other F_1 plants segregate into equal numbers of single and of double-flowering. Author concludes that double-producing strain of the Japanese morning-glory is a heterozygote with both eggs and pollen cells of exactly similar factorial composition, which behaves as a simple Mendelian monohybrid, thus being much simpler than eversporting "d-strain" of *Petunia*, etc., studied by Miss Saunders.—*S. Ikono.*

503. WEATHERWAX, PAUL. The evolution of maize. Bull. Torrey Bot. Club 45: 309-342. 36 fig. Aug., 1918.—Review of theories of evolution of maize and morphological study of all parts of plant of three related genera,—*Zea*, *Euchlaena*, *Tripsacum*,—showing the structural similarity of all three groups when vestigial organs are considered. Homology between female and male spike of *Euchlaena* shown and thereby close similarity between female inflorescence of *Euchlaena* and that of *Zea*. Ear of maize considered to be homologue of central spike of tassel. No morphological evidence to show that either was derived by fusion of more simple parts, agreeing with the view of Montgomery and of Collins. No support is given Collins's hypothesis that maize arose through a process of hybridization between *Euchlaena* and some member of the *Andropogoneae*. Three genera,—*Zea*, *Euchlaena*, *Tripsacum*,—considered to have independent descent from common, extinct, ancestral form. [Abst. by J. M. Coulter] in Bot. Gaz. 67 : 104. Jan., 1919.—*D. F. Jones.*

504. WHITING, P. W., AND HELEN D. KING. Ruby-eyed dilute gray, a third allelomorph in the albino series of the rat. Jour. Exp. Zool. 26: 55-64. May, 1918.—Describes new variety of Norway rat known as "ruby-eyed dilute gray" found near University of Pennsylvania. New variation is recessive to intense pigmentation. When crossed to black-hooded rats all F_1 individuals were intense, and F_2 generation showed 33 intense and 14 dilute. Ruby-eyed dilution is allelomorphic to albinism. The F_2 individuals, called fawns, are intermediate both in hair and in eye color. Fawns when bred together produced eighty ruby-eyed dilutes, 156 fawns, and 80 albinos. Ruby-eyed dilutes crossed with red-eyed yellow rats produce rats of the wild type. Second generation shows evidence of linkage of the two factors, since double recessives did not appear. No linkage is apparent with hooding or with non-agouti.

In agouti dilute sepia pigment is restricted to tips of hairs. Non-agouti are more heavily pigmented.—*F. B. Sumner.*

505. WRIGHT, SEWALL. Color inheritance in mammals. XI. Man. Jour. Heredity 9: 227-240. May-June, 1918.—With respect to color variations in hair, skin and eye of man, only certain rare ones, obviously associated with particular families, depend upon demonstrated unit-factors. Premature grayness, white spotting and albinism belong here. Notwithstanding apparent inheritance of last as a discontinuous variation, no sharp line can be drawn among Europeans between albinism and extreme blondness. There are all grades of imperfect albinos, which may or may not show visual difficulties. View may be safely accepted that albinism in general is due to recessive factors, though no one unit factor is believed to explain all the phenomena.

The ordinary variations in skin, hair, and eye color, are much more difficult to interpret. None of these is obviously discontinuous. All grades between dark brunette and fairest blond are common in persons of British descent. Even with eye color, it appears to author that discontinuity is superficial, there being all grades, depending on amount and situation of pigment. Simple Mendelian interpretations have been attempted, but involve great discrepancies. For example, two blue-eyed parents have been known to have brown-eyed children, which is contrary to theoretical expectations. In general the factor or factors for light eyes tend somewhat more to be recessive than dominant, but no single unit factor seems to be principal cause of differences.

As regards hair color, author believes there is abundant evidence of segregation of some sort. But he also holds that if there is one main factor by which red and light brown differ from black, it must be imperfectly dominant, and that there must be other factors which raise or lower the pigmentation of the heterozygotes from one extreme to the other. Inheritance of skin color, he also believes to give evidence of segregation, though it is impossible to speak of particular Mendelian factors as demonstrated. Thus hair, skin and eye color agree in presence of Mendelian segregation of a complex kind, with dominance tending toward darker types, but probably imperfect as a rule.

Correlation of hair and eye color is treated at considerable length. Familiar association of light hair with blue eyes and dark hair with brown eyes is recognized, but there is still the problem whether this association does not hold merely for races, there being perhaps no such correlation in individuals of a single race. Absence of assortative mating, on such a basis as would account for the correlation between hair and eye color which is found in individuals, is believed proved by analysis of data of Holmes and Loomis. Assortative mating occurs with respect to eye color, but is distinctly negative, i.e., there is shown a distinct preference for a *different* eye color. Author concludes there is no question but that light hair is connected physiologically with light eyes, not only racially but individually.

Particular combinations of hair and eye color are found to be hereditary. This in spite of fact that the parents in population analyzed seem to have preferred to marry those of the color combination most remote from their own.

Author frames provisional hypothesis as to factors concerned in skin and eye color and attempts to compare with similar relations in other mammals. Subject of "color and race" considered briefly, three color races being recognized in Europe: (1) typically blue-eyed, flaxen-haired people around Baltic and North Sea; (2) a "zone of segregating colors;" containing various combinations, surrounding this "area of extreme blondism;" (3) outside the latter, the typically brunette populations of southern and southeastern Europe and Asia.—*F. B. Sumner.*

506. YAMAGUCHI, Y. Beitrag zur Kenntnis der Xenien bei *Oryza sativa*. [Contribution to the knowledge of xenia in *Oryza sativa*.] Bot. Mag. Tôkyô 32: 83-90. May, 1918.—Well known fact that starch character of ordinary rice (staining blue by iodine) is dominant to glutinous starch (staining red by iodine, owing to its containing amyloextrin). By means of iodine reaction of rice grains themselves as well as of their extracts (by alcohol, ether, water) author was able to distinguish hybrid grains from ordinary rice grains colorimetrically. Hydrolysis of extracts by certain acids shows that quantity of invert-sugar in hybrid grains is intermediate between that of ordinary and of glutinous rice grains. Hybrid grains were thus shown to be chemically different from ordinary ones, though apparently quite similar to them. Author concludes therefore that in this case dominance is imperfect.—*S. Ikano.*

HORTICULTURE

W. H. CHANDLER, *Editor*

[Unsigned abstracts are by the editor.]

507. ALBRO, F. W. Chemical constants of avocado oil. Ann. Rep. California Avocado Assoc. 1917: 92-93. April 30, 1918.—Considerable difficulty is experienced in extracting

avocado oil from the fresh pulp. Some was extracted however with petroleic ether, the solution filtered through charcoal, and after further treatment with CO_2 , an oil was obtained of a light golden color, with a bland and pleasant flavor. The chemical constants of the oil are given in tabular form in comparison with olive oil, butter fat, and cottonseed oil.—*I. J. Condit*.

508. ADAMS, CHAS. D. Notes on avocado varieties for commerical orchards. Ann. Rept. California Avocado Assoc. 1917: 31-34. April 30, 1908.—Popular.

509. ANONYMOUS. Effect of June drop is still problematical. The California Citrograph 3rd: 237. Aug., 1918.—Summary of the situation by editor.

510. ANONYMOUS. H. J., Timely hints for avocado growers. Florida Grower 17th: 26. March, 1918.

511. ANONYMOUS. Avocado varieties recommended for planting in California. Ann. Rept. California Avocado Assoc. 1917: 101-103. April 30, 1918.—Recommendations by the Committee on Classification and Registration of Varieties.

512. BEACH, JOHN B. The avocado in Florida. Florida Grower 17: 7. Feb. 2, 1918.—Popular.

513. CHACE, E. M. Citrus byproducts. Florida Grower. 17: 9. Feb. 23, 1918.—Italian hand process for making essential oil of lemon is briefly described. This oil has not been successfully produced in United States of America on account of high labor cost and lack of a suitable mechanical method of production. Citrate of lime is made in same general way both in Sicily and United States of America. Process of producing citric acid from citrate of lime is described with brief discussion of the relative merits of wood, lead, enamelled ware and monel metal containers. Lemons and limes are the only citrus fruits containing sufficient citric acid to make recovery of the acid profitable. A very good grade of vinegar can be made from orange juice, about $1\frac{1}{2}$ barrels being obtained from a ton of fruit.—*C. P. Wilson*.

514. CLARKE, SAM W. Why I prefer the Kadota fig. Fig and Olive Jour. 3rd: 11. fig. 1. June, 1918.—Popular.

515. COLLINS, C. F. The fig and its culture. California Cultivator. 50: 324. March 16, 1918.—General.

516. CONDIT, I. J. The avocado in Central and Northern California. Ann. Rept. California Avocado Assoc. 1917: 35-38. April 30, 1918.—Popular.

517. CULBERTSON, J. D. Renewing old lemon trees. California Citrograph 3: 202-203. 6 figs. July, 1918.—An experiment in rejuvenating lemon trees twenty-five years old whose fruit production had become impaired. Shows effects of pruning at different seasons of the year. Discusses effects of various conditions on the subsequent behavior of the tree. Quality of the fruit was improved, but total quantity harvested was decreased by the pruning.—*H. S. Reed*.

518. DEWEY, MRS. M. H. June drop. California Cultivator 50: 198. Feb. 16, 1918.—Popular.

519. DEZELL, E. G. Why the citrus industry needs a protective tariff. California Citrograph 3: 226-227. Aug., 1918.—The author, representing the Citrus Protective League of California, presented to the U. S. Tariff Commission through its representative, William S. Culbertson, a résumé of conditions confronting the grower and shipper of citrus fruits,

especially the need for a protective tariff for the lemon industry. This is the situation according to Mr. Dezell: There is a possibility of a "dumpage" of Italian lemons after the war since her European markets are demoralized. The Italian lemons will not be needed to supply the demand of this country. Seventy-five per cent of the lemon acreage of California has been non-bearing but is rapidly coming to production which will more than supply the demand of Canada and United States. Increased advertising setting forth the uses of lemons is anticipating this situation. Moreover, the larger production and distribution costs due to the war make competition with foreign markets difficult. Even before the war the cost of delivering a box of California lemons in New York was \$2.73 as against \$1.17 for the Italian lemons. Mr. Dezell gave several tables comparing transportation rates, increased labor and material costs, and home and foreign production so that the Tariff Commission would know the status of the industry to guide it in determining future tariff rates. The condition of the orange industry was also given but the danger from foreign "dumpage" is not so imminent.—*L. W. Bartlett.*

520. ELLIOTT, J. M. Utility and sentiment applied to the avocado. *Ann. Rept. California Avocado Assoc.* 1917: 83-84. April 30, 1918.—Popular.

521. ENGLEHART, J. P. Pruning lemon trees according to types of wood. *California Citrograph* 3: 229. Aug., 1918.—Popular.

522. FESLER, MARTIN. My experience in growing the avocado. *Ann. Rept. California Avocado Assoc.* 1917: 29-30. April 30, 1918.

523. FLEET, W. H. Pruning lemon trees. *California Citrograph* 3: 146-149. 15 figs. May, 1918.—Description of a method of pruning lemon trees by which new shoots are frequently cut back to induce branching. Practical directions are given.—*H. S. Reed.*

524. GROSSENBACHER, J. G. Fertilization of citrus groves. *Florida Grower* 17¹⁶: 10. 1 fig. April 20, 1918.—The subject is discussed under three headings: (1) the time and number of applications to make per year; (2) the amount and manner of applications, and (3) the percentage, composition and source of the necessary elements, if mixed goods are used, and the substances to apply when the simple materials are given. The writer presents his views on these topics as gained from experience and observations.—*I. J. Condit.*

525. HEINY, FRANCIS. Fig culture in the Imperial Valley. *Fig and Olive Jour.* 3²: 11. July, 1918.—Popular.

526. HIRTZLER, VICTOR. The avocado for the table. *Ann. Rept. California Avocado Assoc.* 1917: 51-54. April 30, 1918.—A popular article with recipes and directions for the use of the avocado.

527. HODGSON, R. W. This winter's cover crops especially important. *California Cultivator* 51: 203. Aug. 31, 1918.—Author calls attention to the ruling of the State Food Administrations against the use for fertilizer of materials suitable for stock feed, and also to the scarcity of manure and the high cost of commercial fertilizers. He states, therefore, that the citrus grower is now virtually under the necessity of raising a green manure crop and gives details of planting and handling winter cover crops.—*Gordon Surr.*

528. HODGSON, R. W. Some pointers on June drop. *California Cultivator* 50: 689. fig. 1. June 8, 1918.—Popular.

529. HODGSON, R. W. The Washington navel drop in 1918. *California Cultivator* 51: 99. 1 fig. Aug. 3, 1918.—Popular.

530. HODGSON, R. W. More June drop discussion. *California Cultivator* 50: 260. Mar. 2, 1918.—Popular.
531. HODGSON, R. W. What is a rational system for pruning the Valencia? *California Cultivator* 51: 178. 1 fig. Aug. 24, 1918.—Popular.
532. HODGSON, R. W. Citrus blast. *Quart. Bull. State Hort. Bd. Florida* 2: 123-130. 2 Pl. 1 fig. Jan., 1918.—Information contained in previous articles.
533. JAFFA, M. E., AND F. W. ALBRO.—Studies on the composition and nutritive value of some sub-tropical fruits. *Ann. Rept. California Avocado Assoc.* 1917: 85-91. April 30, 1918.—Tables are given indicating the chemical and physical analyses of the avocado, guava, sapote, and Feijoa, the main part however referring to the avocado. A tabular statement shows that large avocados contain a smaller percentage of oil than small avocados. Experiments conducted at the Nutrition Laboratory have shown that the digestibility of avocado oil is equal to that of other oils. A comparison is made between avocado fat and butter fat. The effect of maturity upon the flavor and quality of the avocado is considered and it is recommended that the fruit be picked when the flavor is at its best.—*I. J. Condit.*
534. JENSEN, C. A. June drop and its relation to the weather. *California Citrograph* 3: 255. 5 fig. Sept., 1918.—An introductory statement is made that no clear-cut case has been made out by students of the "June drop" of the navel orange, for any of the following assigned causes nor for any combination of them, namely, lack of soil moisture at the critical period, low humidity, a certain fungus. Charts are given to show that the climatic conditions of June 1918 were about as good as could be expected in the interior citrus areas and much more favorable than in June 1917. Yet many observers considered the "drop" to be greater in 1918 than in 1917. The importance of taking into account the extremes of local climate rather than the average is emphasized.—*I. J. Condit.*
535. JENSEN, C. A. Effect of different kinds of organic substances on, and relation of humus to orange yields. *California Citrograph* 3: 152. May, 1918.—Details of four experiments, carried out under field conditions in southern California, in which orange trees were basined and mulched with various organic materials. Different substances showed marked differences both on trees and crops, and the yields did not correlate with the amount of humus in the soils. Alfalfa hay and bean straw gave the highest yields while pine shavings decreased the crop. Three of the experiments were started in 1915 and the fourth in 1916.—*Gordon Surr.*
536. JONES, PAUL R. Rejuvenation of lemon grove by three years' spraying. *California Citrograph* 3: 259. 2 fig. Sept., 1918.—Popular.
537. KELLEY, W. P. A new sugar in the avocado. *Ann. Rept. California Avocado Assoc.* 1917: 92. April 30, 1918.—The author gives a brief summary of the investigation made by Dr. F. B. La Forge in the Bureau of Chemistry at Washington of a new sugar hitherto not known to exist in any of the natural fruits. It differs from all previously known natural sugars in containing seven carbon atoms and is peculiar in the fact that it is apparently unfermentable. The name, D-Mannoketoheptose has been given it. The amount of sugar in the avocado varies from 0.5 to 1 per cent.—*I. J. Condit.*
538. LEWIS, E. S. Pruning lemon trees six to twenty years old. *California Citrograph* 3: 230. 2 fig. Aug., 1918.—Popular.
539. MARKARIAN, HENRY. Caprification of the Smyrna fig. *Fig and Olive Jour.* 3: 9. June, 1918.—Popular.

540. MILLS, J. W. The Mission fig. *California Cultivator* 50: 39. Jan. 12, 1918.—Popular.
541. MORROW, J. E. The use of chayotes and their culture. *Florida Grower* 17: 5. June 1, 1918.—Popular.
542. NEEDHAM, C. E. How do the citrus growers view the avocado? *California Citrograph* 3: 215. July, 1918.—Popular.
543. NEWBY, E. The purpose of the California Fig Growers' Assoc. *Fig and Olive Jour.* 3: 13. Aug., 1918.—Popular.
544. POPENOE, WILSON. Avocados as food in Guatemala. *Jour. Heredity* 9: 99-107. March, 1918. [Illustr.]—The avocado is a very common food in parts of the Guatemalan highlands where the fruits may be obtained during eight months of the year. Only the best fruits are of marketable value and they are sold for about half a cent each. The avocado replaces meat in the dietary of the natives and together with tortillas furnishes a sustaining food for the *cargadores* and other hard workers. References are made to the results of investigations of the California Station and of the Bureau of Chemistry on the food value of the fruit. Comparisons are made between the olive and the avocado as sources of oil.—*I. J. Condit.*
545. POPENOE, WILSON. Exploring Guatemala for desirable new avocados. *Ann. Rept. California Avocado Assoc.* 1917: 104-138. *Pl. III-VIII, fig. 4-34.* April 30, 1918.—An account of the author's trip to Guatemala where he was sent by the Department of Agriculture at the request of the California Avocado Association. Budwood of thirty-six varieties was secured and forwarded to Washington, D. C., and to Miami, Florida, for propagation. The best results in shipping were secured during May, June, and July, the budsticks being simply placed in moist sphagnum moss and wrapped in heavy oiled paper.—All three types of the avocado are found in Guatemala, the West Indian, the Mexican, and the Guatemalan, the last being by far the most important. The West Indian type is common on the coast and is found up to an elevation of 2500 feet where it disappears. The Guatemalan type commences at 3000 feet and is most abundant from 4000 to 6000 feet and disappears entirely between 8500 and 9000 feet. Only two trees of the Mexican type were found.—The climatic zones in Guatemala and the characteristics of each are described and the fruits found commonly in each are listed. The avocado appears to be best in regions where the rainfall is not over 75 inches. In order to obtain hardy varieties the region at the upper limit of cultivation was visited and one variety, the Pankay, was discovered which had not been injured in the slightest by cold although most were killed back or severely injured.—The most important avocado regions are, in the order of their importance, Antigua, San Cristobal Verapaz, Purula, Amatitlan, the valley of Panajachel, and Momostenango. The largest trees were on clay soils yet good sized trees grew upon the volcanic loam of Antigua. The trees seem to have a habit of bearing a heavy crop one year and a light crop or no crop at all the following year. The variation in season of the fruit in Guatemala is due to two causes, first, altitude as expressed in its effect upon temperature, and second, the normal differences exhibited by seedlings. The Guatemalans consider the avocado mature and ready for picking when the tree comes into bloom although the flavor and quality is improved by allowing it to remain on the tree several months longer. Fully half of the seedling fruits found were green in color when mature; the appearance of purple color on certain varieties indicates maturity.—The native home of the Guatemalan type of avocado has not been definitely determined according to the author but he is inclined to believe that it may be in extreme northern Guatemala or across the Mexican frontier in the states of Chiapas and Tabasco.—Detailed notes are given on form, size, character and thickness of skin, color, quality, flavor, and seed of the avocados of Guatemala. A list of twenty-three varieties introduced for trial is given with a description of each and outline drawings of twenty. The article is well illustrated.—*I. J. Condit.*

546. POPENOE, WILSON. How about the cherimoya? California Citrograph 3: 102. 1 fig. March, 1918.—Impressions of the cherimoya are given, as gained by the writer during his trip to Guatemala. The previous statements in literature regarding 16-pound cherimoya were disproved as the largest found weighed just 5 pounds.—As an index to the hardiness of the tree the upper limit of cultivation was found to be only 500 feet below that of the Guatemalan race of avocados. It thrives between elevations of 3000 to 8000 feet where seedlings spring up along the roadsides by the hundreds, but it does not succeed at all in the hot, humid lowlands. The question of pollination of the flowers is considered and the writer ventures the assertion that Southern California is the one place in the United States where the cherimoya can be successfully produced on account of climatic conditions which favor pollination and the proper development of the fruit.—Much variation was observed in the fruitfulness of the seedling trees in Guatemala. Severe pruning to rid the trees of mistletoe seemed to favor fruit production as young wood produces a great abundance of flowers. Some unpruned trees, however, were equally as productive. Budwood of the productive trees in Antigua were sent to the United States for trial.—I. J. Condit.

547. RIXFORD, G. P. Influence on the fig industry of the Maslin seedling fig orchard at Loomis. Fig and Olive Jour. 3: 14. Aug., 1918.—The Maslin seedling fig orchard at Loomis, California, was planted in 1886 by E. W. Maslin. The orchard containing seventy-two capri fig trees was leased by the U. S. Department of Agriculture in 1910 and since that time large quantities of capri figs and cuttings have been distributed throughout the fig regions of California and others states. New varieties of figs have been developed by crossing and several of these are briefly described.—I. J. Condit.

548. ROBERTSON, R. T. Tangelos: What they are; the value in Florida of the Sampson and the Thornton varieties. Florida Grower 18: 5. Sept. 21, 1918.—The tangelos are the result of crosses between the tangerine and the grapefruit but the fruits resemble round oranges more than either parent. This article deals with two varieties, the Sampson and the Thornton which have been grown in a small way, chiefly for home use, although commercial plantings are being made at several places in Florida. The characteristics of each are given and the possibilities of similar hybrids discussed especially in regard to resistance to citrus canker.—I. J. Condit.

549. ROEDING, G. C. Caprification and varieties of capri figs. California Cultivator 51: 27. 3 fig. July 13, 1918.—The early history of the Smyrna fig in California, the Maslin seedling fig orchard, and the early attempts to introduce the fig wasp (*Blastophaga grossorum*) are discussed. Facts are presented to refute the contentions of G. P. Rixford and W. T. Swingle that the *Blastophaga* had become established accidentally many years previous to 1899. Notes are given on the life history and habits of the *Blastophaga*. A few varieties of capri figs which the writer has found satisfactory are listed.—I. J. Condit.

550. SCOTT, L. B. Avocado varieties in Florida. Florida Grower 18: 4-5. 1 fig. Aug. 17, 1918.—Popular.

551. SCOTT, L. B. Strains of Satsuma oranges in the United States. Florida Grower 17: 7. April 6, 1918.—Variations in Satsuma oranges as observed in the United States by the writer and in Japan by Dr. T. Tanaka are discussed. Six so-called strains are described by Dr. Tanaka in a previous publication, while three strains were classified in this country by the writer and are described in this article. The importance of segregating each of these strains on account of differences in season of maturity, is emphasized.—I. J. Condit.

552. SCOTT, L. B. Strains of Satsuma oranges in United States. California Citrograph 3: 254. 2 fig. Sept., 1918.—Information noted from another source. [See Bot. Absts. 1, Entry 550.]

553. SCOTT, L. B. Comparative merits of the California avocado varieties. Ann. Rept. California Avocado Assoc. 1917: 57-62. April 30, 1918.—The writer emphasizes the importance of reducing the number of avocado varieties to five or six standard ones which will assure a supply of good commercial fruit throughout the year. The following list includes those which seem to approach the requirements of an ideal avocado: Sharpless, Fuerte, Surprise, Spinks and Taft. Notes are given of each variety as well as several others considered of commercial importance. Variation within the variety is discussed.—*I. J. Condit.*

554. SHAMEL, A. D. Some effects of shading lemon trees. Month. Bull. California State Comm. Hort. 7: 441-451. 4 fig., 8 tables. July, 1918.—Seventy-six lemon trees were enclosed in tent of tobacco cloth in a grove at Corona, California. Records of wind velocity, air temperature, air humidity, soil moisture and fruit yields were kept, both within and without the tent. The average wind velocity and humidity were lower inside the tent. The average temperature of the air was slightly higher inside the tent than outside, but the relative humidity was slightly lower inside the tent. The moisture content of the first 3 feet of soil inside the tent was higher than that of the comparative soil area outside. In the second 3-foot layer the soil moisture was practically the same within and without the tent.—The trees under the tent seemed to bring a larger proportion of their fruit to maturity in the winter and fall months. The difference in total production was only slightly greater under the tent, but the trees produced a higher proportion of green fruits.—*H. S. Reed.*

555. SHAMEL, A. D. Why navel oranges are seedless. California Citrograph 3: 204. July, 1918.—Popular.

556. SHARPLESS, B. H. History of the Sharpless and the Monroe avocados, and my observations and experiences in propagating the same. Ann. Rept. California Avocado Assoc. 1917: 26-28. April 30, 1918.—A short account of the history, bearing qualities, and the writer's success in propagating the two varieties is given.—*I. J. Condit.*

557. SHEDDEN, THOMAS H. Practical ideas for popularizing the avocado. California Citrograph 3: 54. Jan., 1918.—Popular.

558. SHEDDEN, THOMAS H. How shall we eliminate the misnomer "Alligator Pear?" Ann. Rept. California Avocado Assoc. 1917: 41-43. April 30, 1918.—Popular.

559. SPINKS, W. A. Interplanting and changing varieties. Ann. Rept. California Avocado Assoc. 1917: 44-48. 1918.—The writer suggests a plan for planting two or four varieties of avocados in the same orchard in such a way that the poorer varieties can be removed at any time, leaving one for the permanent planting. Four methods of top-working are discussed, namely—grafting into stubs in February; budding into the base of sprouts forced out for the purpose; budding directly into the bark of the trunk or main branches; budding into the old bark of stubs just as the new shoots start.—*I. J. Condit.*

560. STEWART, MRS. MARGARET. My experience in growing avocados. Ann. Rept. California Assoc. 1917: 63-66. April 30, 1918.—Popular.

561. TAFT, C. P. The Taft avocado and its history. Ann. Rept. California Avocado Assoc. 1917: 55-56. April 30, 1918.—A short account of the history and characteristics of the variety.—*I. J. Condit.*

562. TRIBBLE, CLAUDE. Caprifying the Smyrna fig. California Cultivator 51: 7. July 8, 1918.—Popular.

563. TRIBBLE, C. D. The pistache in California. California Cultivator 50: 63. 1 fig. Jan. 19, 1918.—*Pistacia vera* is said to be a dry-land tree and should prove well adapted to

the foothills of California. *P. chinensis* which has been used for a stock is slow growing and dwarfs the more rapidly growing *P. vera* grafted on it. Directions for growing the seedlings, budding and grafting the stocks, and planting the trees are given. The best varieties are the Trabonella and Red Aleppo.—*I. J. Condit.*

564. VOSBURG, E. D. Avocado varieties in Florida. Ann. Rept. California Avocado Assoc. 1917: 24-26. April 30, 1918.—The question of varieties is an important problem in Florida, as in California. Of the 500 acres of budded groves in Florida, upward of 90 per cent consist of the Trapp variety. The first trees of the Guatemalan type bore in Florida in 1912 and budwood of many varieties has been introduced. The Fuerte, Taft, Taylor, Murrieta, and Beardslee are reported as having fruited. In Florida the Guatemalan varieties mature from one to three months earlier than the same varieties in California. Trees of the Mexican type have withstood temperatures of 20° and are therefore attracting some interest.—*I. J. Condit.*

565. WAGNER, C. F. The Wagner, Lambert, and Surprise avocados. Ann. Rept. California Avocado Assoc. 1917: 28-29. April 30, 1918.—Short account of the origin and fruitfulness of the three varieties.—*I. J. Condit.*

566. WEBBER, H. J. Cold resistance of the avocado. Ann. Rept. California Avocado Assoc. 1917: 49-51. 1918.—This article sums up the information received by the writer from fifty replies to a questionnaire sent to members of the Association. The following factors influencing injury are briefly discussed: age of tree; condition of growth; constitutional condition; and time when irrigated. Notes are given on the comparative hardness of varieties.—The following table of temperature endurance was prepared from the data collected:

30°F.—Nothing injured as far as could be observed.

29°F.—No injury of account; only traces on most tender growth of West Indian and Guatemalan varieties.

28°F.—New foliage scorched on Guatemalan types; West Indian varieties showing considerable foliage damage.

27°F.—Mexican varieties, with new tips slightly scorched; Guatemalan, with almost all new foliage injured; West Indian badly damaged.

25°F.—26°F.—Mexican varieties, with new foliage injured but some dormant trees uninjured; all Guatemalan sorts, with new foliage badly injured, and some old foliage scorched.

24°F.—Some dormant Mexicans uninjured; Guatemalan varieties badly injured, small limbs frozen back.

21°F.—All Guatemalan types killed to bud; a few of hardest Mexicans, such as Knowles and San Sebastian, with young leaves only, injured.—*I. J. Condit.*

567. WEBBER, H. J. Work and aim of the citrus experiment station. California Citrograph 3: 134. May, 1918.—The new Citrus Experiment Station and Graduate School of Tropical Agriculture at Riverside was dedicated March 27, 1918. Dr. H. J. Webber, Dean and Director of the station set forth its function as two-fold, investigation and instruction, and illustrated its work by an account of the experiments conducted by the old citrus experiment station in Riverside to determine the value of various elements in soils, the best kind of fertilizer, the worth of cover crops, and the suitability of various root stocks. Some of the results of these experiments show that nitrogen is by far the most important of the ordinary elements used in citrus fertilization, that plots fertilized with stable manure are more thrifty and show less mottle leaf than plots treated with chemical fertilizer, and that cover crops increase greatly the fertility of the soil. To conduct these experiments and others in process the Experiment Station has built up a strong faculty of specialists in special divisions as chemistry, plant physiology, plant pathology, entomology, soil physics, plant breeding, and orchard management. Efficiency and seriousness of purpose characterize the spirit of the institution.—*L. W. Bartlett.*

568. WHITNEY, D. J. Orange details: the matter of the June drop. California Cultivator 50: 256. Sept. 14, 1918.—Popular.

569. WHITTEN, R. H. Development of California's fig industry. Pacific Rural Press 96¹⁰: 254. 1 fig. Sept. 7, 1918.—Popular.

570. YOKUM, F. W. Soil selection for fig growing and its treatment. Fig and Olive Jour. 2¹¹: 6. April and May, 1918.—Popular.

571. YOKUM, MRS. F. W. Proper curing of the fig essential to the success of the industry. Fig and Olive Jour. 3²: 9. July, 1918.—Popular.

572. ZOLLER, HARPER F. Some constituents of the American Grapefruit. (*Citrus decumana*). Jour. Ind. Eng. Chem. 10: 364. May 1, 1918.—A condensed historical sketch indicates introduction to U. S. A. via Mexico. The common claims as to medicinal value of G. are shown to be without proven foundation. Author is investigating the bitter principle identified as Naringin to demonstrate therapeutic value. Analysis of peel showed recoverable amounts of essential oil similar to orange oil, the glucoside Naringin ($C_{21}H_{26}O_{11} \cdot 4H_2O$) and pectin. Naringin is levorotatory (mol. rot. in $C_2H_5OH = -65.2$, $18^\circ C.$) cream colored monoclinic crystals, hydrolyzes to form mixture of rhamnose and glucose. Naringin is considered of importance in differentiations of *C. decumana* from other citrus species. Grapefruit culls are regarded as a satisfactory source of commercial pectin, citric acid and possibly industrial alcohol. Naringin and pectin content increase during storage. Reducing sugars and sucrose increase.—C. P. Wilson.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

573. MURPHY, PAUL A. The morphology and cytology of the sexual organs of *Phytophthora erythroseptica* Pethyb. Ann. Bot. 32: 115-153. 2 pl. 1918.—A morphological and cytological study of the peculiar type of sexual reproduction which had been described by Pethybridge as based upon his observations on living or fresh material. Author describes in detail his cultural and staining technique. The antheridia and oogonia arise from different hyphae but the fungus is homothallic. The antheridium is first formed and is then pierced by the developing oogone which is, however, fully formed only after passage through the antheridium. There is a conspicuous degeneration of the nuclei present in both sexual structures before any nuclear division takes place. The remaining nuclei increase in size and become aggregated into a hollow sphere with a single nucleus lying in the center. The nuclei of this sphere now divide and it was possible to note all stages up to telophase when the degeneration of these nuclei takes place. The chromosome number was found to be four or six. At this time there appears a structure protruding from the oogonium into the antheridium. This corresponds in part to what has been called the receptive papilla by workers on related forms but for which the author suggests the term "manocyst." This persists for some time after the central nucleus has divided and after the migration of one of these sister nuclei to the periphery, when it disappears with the formation of the fertilization tube which here is a part of the oogonium. Only a single nucleus enters the oogone and comes to lie close to the female nucleus, but fusion of the male and female nuclei does not take place until after the formation of the three layers of the oospore wall. The cytology of the oospore following the sexual fusion was not studied. The entire study indicates a very close relationship of *Phytophthora* to *Pythium*, *Sclerospora* and *Plasmopara*. [See Bot. Absts. 1, Entry 1587.] —E. M. Gilbert.

574. ERICKSSON, JACOB. Développement primaire du mildiou (*Phytophthora infestans*), au cours de la végétation de la pomme de terre. [Primary development of *Phytophthora infestans* and its course in the tissues of the potato.] Rev. Gén. Bot. 29: 257-260, 305-320, 333-349, 376-380; 30: 16-30, 50-62. 6 pl., 5 fig. 1918.—This series of papers is divided into four parts, the first of which is given over to a résumé of the earlier views of such men as Berkeley, Kuhn, de Bary, Wilson, Smith, and others as to the methods of hibernation of the fungus. The second portion reviews the work of Clinton (1904-1910); Jones, Lutman, and Giddings (1904-1910); Pethybridge and Murphy (1911-1913); and Melhus (1912-1915). The author finds no satisfactory explanation in any of these studies and states the problem as one of discovering the actual method of hibernation, which he feels has been partly hinted at by Wilson and Smith; that is, there must be a plasmic latent phase found in the tuber itself. The remainder of the paper briefly gives the evidence based upon cytological studies and illustrated by microphotographs.

The author finds the first appearance of the disease indicated by characteristic spots on the mature leaves of the plant. These show a definite zonation; a dark central portion surrounded by a greyish velvety zone, outside of which is one of a pale green, rather distinctly set off from the normal green of the healthy leaf. Cytological studies of these areas show distinct evidence of an existing mycoplasmic condition in the tissues, first distinctly noted in the pale green layer where a number of small dark granules are found between the chlorophyll bodies. This is followed by a disintegration of the chlorophyll and the sudden appearance of several nucleoles. The granules and nucleoles now aggregate in various parts of the cell, giving the characteristic mycoplasmic condition described by the author in earlier papers. Hyphae are soon organized in the intercellular spaces of the velvety zone and are noted to be of two types; one female, giving rise to oogones, the other male, and producing antheridia. Oospores are found in the central area, often in groups. Instead of resting, as is usually supposed, they immediately germinate, sending the conidiophore through the stomata and soon producing the conidia, each of which produces eight zoospores. The entire process is probably completed in less than twenty-four hours.—*E. M. Gilbert.*

575. CAMPBELL, D. H. Studies on some East Indian Hepaticae. Ann. Bot. 32: 319-333. Pl. 8, 9. 10 fig. 1918.—Two related genera of the Marchantiaceae, *Dumortiera* and *Wiesnerella*, are considered. In *Dumortiera* the air chambers, which are so conspicuous a feature in typical members of the family, are partially or wholly suppressed. The author regards this suppression as secondary and associated with the hygrophilous habit of the species. In *Wiesnerella* air chambers are present, but the genus shows evidence of reduction in the simple pores of the female receptacle. In the region studied *Dumortiera* is represented by the following three species: *D. trichocephala*, widely distributed in the Indo-Malayan region and Oceanica; *D. velutina* known only from Java and Sumatra; and *D. calcicola*, a Bornean species proposed as new. *Wiesnerella*, on the other hand, is monotypic, its only species, *W. denudata*, being known from Java, the Himalayas, Japan and Hawaii. In *D. calcicola* the fertile thallus is characterized by a jointed appearance, produced by successive apical innovations. Both male and female receptacles are borne on the same plant, and both are apparently sessile. The sessile condition of the female receptacle, however, may be associated with the absence of fertilization, no capsules being present. The vegetative organs and the general features of the sexual receptacles are taken up briefly in both genera, greater emphasis being laid on the sexual organs and the sporophytes. In *Dumortiera* the development of the antheridium is essentially the same as in the other Marchantiaceae. The mature antheridium is distinguished by a conspicuous apical beak. The division of the spermatocytes is not diagonal as in *Marchantia*, and it is possible that it may be suppressed altogether. The development of the archegonium presents no distinctive features. The embryogeny of *Dumortiera* is described in detail, apparently for the first time. At maturity the seta elongates enough to enable the capsule to protrude completely. Dehiscence takes place by means of four somewhat irregular valves, which usually undergo secondary splittings. In its younger stages the sporophyte is comparable with that of *Plagiochasma*; in its later stages it is closer to those of *Preissia* and *Marchantia*, although the foot is less

clearly defined. Under *Wiesnerella* the epidermal pores, air chambers, ventral scales and rhizoids are briefly described, and the many points of agreement between the sexual receptacles and those of *Dumortiera* are emphasized. The archegonia are essentially the same in both genera and the sporophytes, as far as could be determined from late stages of development, present no striking differences. The ripe spores of *Wiesnerella*, however, are larger than those of *Dumortiera* and show wing-like ridges instead of small papillae on the surface. [See Bot. Absts. 1, Entry 1046.]—*Alexander W. Evans.*

576. STEWART, F. C. Tubers within tubers of *Solanum tuberosum*. Brooklyn Bot. Gard. Memoirs 1: 423-426. 3 fig. 1918.—Author records cases of the development of large new potato tubers within old ones which had been stored over summer. He shows that these new tubers are formed on ingrowing sprouts and notes that they are similar to those previously described by Gager, except for being considerably larger.

577. HARRIS, J. ARTHUR. Further studies on the interrelationship of morphological and physiological characters in seedlings of *Phaseolus*. Brooklyn Bot. Gard. Memoirs 1: 167-174. 1918.—A continuation of author's studies on relationship between morphological and physiological variations. Seedlings of *Phaseolus* which were somewhat abnormal structurally, in that they showed a slight vertical separation of the two cotyledons in their insertion on the axis, were grown each beside a normal seedling from the same seed plant, under similar environmental conditions. The primordial leaves and the first trifoliate leaf of the abnormal plants both produced a decidedly smaller weight of green leaf tissue and of dry substance than the corresponding leaves of normal plants. The percentage of dry weight produced in the leaves is also lower in the abnormal seedlings, but the difference between the two groups is much less marked than in the previous cases. Author concludes that plants with morphological abnormalities are also abnormal physiologically. [See Bot. Absts. 1, Entry 884.]

578. MACDANIELS, L. H. The histology of the phloem in certain woody Angiosperms. Amer. Jour. Bot. 5: 347-378. Pl. 24-29. 1918.—Records the results of a detailed comparative investigation of the structure of the phloem in 54 species of woody plants selected from 21 families of Dicotyledons. The author criticises the work of Hemenway and discusses the phylogenetic significance of the various types of vessels and sieve tubes with reference to the conservatism of seedlings and first annual rings. He states that there is no fundamental difference in type between sieve tubes in seedlings and in mature plants, but that in the former the sieve tubes are smaller and relatively less numerous than in the latter. The phloem of seedlings is very similar to that of one-year-old twigs. Companion cells are present in all families studied. There is little correlation between type of vessel and type of sieve tube. The sieve tubes of the lower woody Dicotyledons are fundamentally different from those of gymnosperms and vascular cryptogams. Widely different types of sieve tubes are found in species of the same family and even of the same genus, and there seems to be no gradual advance in sieve tube type which parallels our present ideas of phylogeny. The author concludes that in such a case as this, evidence from anatomy will be of phylogenetic significance only when gathered in great abundance and from a very wide range of forms.

579. SINNOTT, EDMUND W. Conservatism and variability in the seedling of dicotyledons. Amer. Jour. Bot. 5: 120-130. 4 fig. 1918.—As a result of a study of seedling anatomy the author emphasizes the conclusion that a delimiting of certain stages in ontogeny as retentive or recapitulatory of ancestral features, in their entirety, cannot successfully be made. The study of more than 250 species belonging to 86 families has confirmed the observations of others as to the extensive variability of seedling structure in many respects. The structure of the cotyledonary node, however, is found to be remarkably uniform throughout large plant groups. The primitive type of leaf trace in ferns and seed plants has been shown to be a double one, or one consisting of an even number of strands. In dicotyledons, the author finds that although an odd number of veins is characteristic of all cotyledons (as

of foliage leaves), a feature evident externally in the strong midvein, it has arisen by a fusion of the two median bundles of the ancient type; and that the cotyledonary traces of all dicotyledons retain the ancestral condition, the median trace, single and central in the blade, being a double bundle in its origin. The relation between the vascular systems of the hypocotyl and the epicotyl, and the number of gaps caused by the departure of the cotyledonary trace, were also found to be very constant, as was the type of venation of the cotyledon. "The seedling of dicotyledons is therefore variable in certain of its characters and conservative in others, thus emphasizing the importance of studying conservatism and variability in connection with particular characters rather than with particular organs or regions."—A. J. *Eames*.

580. SINNOTT, EDMUND W. Factors determining character and distribution of food reserve in woody plants. Bot. Gaz. 66: 162-175. 2 fig. 1918.—Gives the result of an extensive survey of the distribution of fat and starch in the stems (chiefly twigs and young branches) of woody plants at different seasons of the year. During the winter, starch was found to be most abundant in regions remote from centers of conduction and in cells with thick, well lignified, or small-pitted walls; fat, near the phloem, close to vessels, or in cells with thin or unlignified walls or large pits. The author suggests that the ease with which water or substances carried in water have access to the cell is probably a determining factor, and that "differences in the type of food reserve may be due to differences in water content of the various storage cells, resulting in modification of enzyme activity, or differences in the ease with which enzymes have effective access to the storage cells."—I. W. *Bailey*.

581. LANGDON, LADEMA M. The ray system of *Quercus alba*. Bot. Gaz. 65: 313-323. 22 fig. 1918.—The author gives a synopsis of previous papers on the origin and interrelation of the various types of medullary ray in the wood of the Angiosperms, discusses these theories briefly and states the results of her study to obtain evidence bearing, not directly on the comparative morphology of ray types, but on the effect of growth conditions, position in tree, age of tree, etc. *Quercus alba* was studied intensively, material from various parts of three trees of different age and vigor being worked over. The conclusion is drawn that the ray system is not appreciably affected by the age or vigor of the tree or of the branch, or by location in the tree. Decreasing vigor of growth in mature wood, however, brings about progressively later and later appearance of multiseriate rays. This type of ray in seedlings and in the first annual ring was found to occur only in the region of departure of lateral leaf traces. The statements of previous writers that the influence of these traces is responsible for the form of the stele in oak stems,—five depressed segments alternating with five raised portions—are confirmed and elaborated. [See Bot. Absts. 1, Entry 1154]—A. J. *Eames*.

582. NOTHNAGEL, MILDRED. Fecundation and formation of the primary endosperm nucleus in certain Liliaceae. Bot. Gaz. 66: 143-161. Pl. 3-5. 1918.—The chromatic phenomena attending fertilization and early endosperm formation in *Trillium grandiflorum* and *Lilium Martagon* have been investigated by the author. A brief history of double fertilization and triple fusion is given and attention is called to the fact that in no case have the chromatin changes in the first division following the contact of these fusing nuclei been carefully worked out for the Angiosperms. In *Trillium grandiflorum* the nuclear membranes separating the egg and sperm disappear and the nuclear content of the two is surrounded by a common membrane; the male and female chromatin do not fuse, and remain distinguishable up to the time of their arrangement on the equatorial plate. In both genera studied the chromatin of the three nuclei, which take part in the so-called triple fusion, remains distinct up to the formation of a typical bipolar spindle. One nucleus in the third division of the endosperm nuclei in *Trillium grandiflorum* showed three distinct groups of chromatic segments consisting of six chromosomes each.—Margaret C. *Ferguson*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

583. ARBER, A. N. A note on submedullary casts of coal-measure calamities. *Geol. Mag.* 5: 212-214. Dec. 6, 1918.—A short note pointing out the confusion originating from attempts to identify supposed pith casts of various *Calamites* which were in reality not true pith casts but incrustations of surfaces external to the pith, but not actually natural exterior surfaces. The name "sub-medullary" casts is suggested for them, and the conclusion drawn that they should be considered as specifically indeterminable.—*M. C. Stopes.*

584. BAILEY, I. W., AND W. W. TUPPER. Size variation in tracheary cells: I. A comparison between the secondary Xylems of vascular cryptogams, gymnosperms and angiosperms. *Proc. Amer. Acad. Arts Sci.* 54: 149-204. 1918.—This is the first paper giving the results of a comparative study of the secondary xylem, more especially the tracheary elements, of vascular plants. The tabulated results are extensive and of great value to comparative anatomists, and the relationship between size of the elements and the stage of evolution of the different groups appears to be of definite phylogenetic value. It is shown that the tracheary elements in the so-called vascular cryptogams are very long, whereas among the gymnosperms belonging to the cordaitalen and cycadophyte alliances they approximate more or less those of the cryptogams, while the Gnetales on the other hand resemble the conditions found among the angiosperms. Among the latter, with the exception of the Trochodendraceae and Magnoliaceae, the elements are relatively very much shortened. In all dicotyledons and gymnosperms except Cordaitales and Cycadophyta the first formed tracheary cells of the secondary wood are relatively short and actually shorter than the adjoining elements of the primary wood or the subsequently formed elements of the secondary wood. This is in marked contrast to what prevails in the lower vascular plants which possessed relatively wide zones of primary wood. A second tendency toward reduction in length appears to have resulted from the evolution and differentiation of vessels. That the specialization concomitant with evolution resulted in shortening is indicated not only by the comparison between cryptogams and gymnosperms, but also by the similarity in this respect between angiosperms and the gnetalean gymnosperms and by the unusual length of the tracheids in the vesselless angiosperms Trochodendraceae, Drimys, etc. Certain correlations are also traced to other factors, as shown by the shorter elements in the slow growing and slender stemmed conifers (Taxaceae, Cupressaceae) and in the larger elements in the larger and more rapidly growing conifers. The effects of dwarfing and depauperation within a species shows in the shortening of the elements; and shortening is also recorded for regions where tissue adjustments are taking place as at the junction of root and stem, branches, wounds, compression wood, etc. There appears to be no absolute correlation between body size and cell size. [See Bot. Absts. 1, Entry 998.]

585. BERRY, EDWARD W. Notes on the fern genus *Clathropteris*. *Bull. Torrey Bot. Club* 45: 279-285. 2 t. f. 1918.—Describes an exceptional specimen of *Clathropteris platyphylla* (family Dipteriaceae) from the upper Triassic near Richmond, Virginia, and gives a restoration involving a new interpretation of the frond habit.

586. BERRY, EDWARD W. A restoration of *Neocalamites*. *Amer. Jour. Sci.* 45: 445-448. 2 fig. 1918.—Discusses the genus *Neocalamites* which represents descendants from the Paleozoic *Calamites* recently found to be not uncommon in the older Mesozoic rocks. A restoration is given and described of *Neocalamites knowltoni*, a striking form from the upper Triassic near Richmond, Virginia.

587. HICKLING, G. A contribution to the micro-petrology of coal. *Trans. Inst. Mining Engineers* 53: 137-158. Pl. I-IV. 1918.—The author points out that it is scarcely an

exaggeration to say that no rock in the Earth's crust is less understood than coal. Without going into previous literature, the author makes several observations on "dull" and "bright" layers of coal, discusses "streak" and "mother of coal" and other points. In conclusion, he classifies coal in three groups: (1) Humic, (2) Cannelloid, (3) Bogheads.

The value of the paper chiefly lies in its excellent colored illustration of coal sections, showing woody tissue, and its other good micro-photographs.—*M. C. Stopes.*

588. KNOX, G. Some notes on the origin and composition of coal. *Proc. S. Wales Inst. Engineers* 34: 32-77. Pl. VI. 1918.—A semi-popular address, well illustrated, largely embodying the results of research work already published by many authors without references to the literature of the subject.—*M. C. Stopes.*

589. KRYSHTOFOVICH, A. N. On the Cretaceous Age of the "Miocene Flora" of Sakhalin. *Amer. Jour. Sci.* 46: 502-510. Sept., 1918.—A considerable fossil flora was described from the Island of Sakhalin in 1878 by Oswald Heer, who determined its age to be Miocene and it has been so considered since that time. The author explored the region in 1917 and demonstrates that Heer's materials were partly Cretaceous and partly Tertiary which were unintentionally mixed by the collectors of 1878. Kryshstofovich announces three series of beds below the true Tertiary—an Upper Cretaceous Orokkian series, a Middle Cretaceous Gylakian series and a Lower Cretaceous Ainuian series—all plant bearing, especially the middle series which contains many forms common to the Atane beds of Greenland, the Raritan and Magothy formations of the Atlantic Coastal Plain and the Dakota sandstone of the western United States. The problem of the place of origin of the flowering plants is bound up in the study of Cretaceous floras. That they originated on one of the land masses of the Northern Hemisphere is now conceded, but the lack of any Asiatic records has heretofore been a most serious gap in the available records. The present paper is a preliminary abstract as much of the collected material was inaccessible in Petrograd at the time it was written in Tokyo. More exhaustive studies should yield results of the greatest importance.

590. KRYSHTOFOVICH, A. On the Cretaceous flora of Russian Sakhalin. *Jour. Coll. Sci. Imp. Univ. Tokyo.* 40³. 73. 15 fig. 1918.—A partial elaboration of the flora mentioned in the previous abstract from the Cretaceous of Sakhalin, formerly thought to be of Tertiary age. This flora is remarkable for its cosmopolitan character and contains many forms common to North America, Europe and the Arctic. New species are described in *MacClintockia*, *Celastrophyllum*, *Aralia*, *Stenopteris*, *Dicksonia* and *Gleichenia*.

591. SAHNI, B. On the branching of the zygopteridean leaf, and its relation to the probable "pinna" nature of *Gyropteris sinuosa* Goeppert. *Ann. Bot.* 32: 369-379. 3 fig. 1918.—A detailed consideration of the course and significance of the pinna traces, particularly in relation to Bertrand's views. The suggestion is revived that *Gyropteris sinuosa* Goepp. is a secondary rachis of a form like *Metaclepsydropsis* or *Diplolabis*.—*M. C. Stopes.*

592. SCOTT, D. H. Notes on *Calamopitys*, Unger. *Jour. Linn. Soc. London, Bot.* 43: 204-232. 1 fig. 2 pl. 1918.—The author presents additional evidence of the course of the leaf trace and is mainly concerned with a re-examination and more complete description of the five known species of *Calamopitys*, a somewhat anomalous type coming from the upper Devonian and Lower Carboniferous of Europe and North America. The relationships are discussed and the known species are considered to represent a natural series and not yet capable of generic segregation. Their nearest affinity is held to be with the *Lyginopteriacae* among the *Pteridospermophyta* through the genus *Heterangium*, and the two species *C. fascicularis* and *C. Beinertiana*, for which Zalesky proposed the new genus *Eristophyton*, are admitted to show structural advances in the direction of the *Cordaiales*.

593. SCOTT, D. H. The structure of *Mesoxylon multirame*. *Ann. Bot.* 32: 437-457. 2 fig., pl. 11-4. 1918.—In continuation of former studies the author gives an account of the species *Mesoxylon multirame* from the English Coal Measures—the genus *Mesoxylon* being a type of

Cordaitales differing from the normal in the presence of centripetal xylem in the stem. In the present species this persists as long as the two strands of the leaf trace remain distinct. The only important difference from the previously described *M. poroxyloides* is in the course of the leaf traces—a specific distinction, and in the organization of the axillary steles—probably a functional adaptation. It differs from *M. Sutcliffei* and *M. Lomaxii* primarily in the structure of the inner zone of the wood and from the latter in the course of the bundles. Points of general interest are the presence of tangential pits on some of the tracheides and the occasional presence of xylem parenchyma; the probably resiniferous secretory sacs, sieve tubes and parenchyma arranged more or less concentrically to form the phloem; the lateral connections of the axillary stele and its frequent division in passing inward; the distichous branching of the axillary shoots; and the branches with scale leaves or bracts. Further studies of these most important Paleozoic types are promised.

594. STOPES, M. C. New Bennettitean cones from the British Cretaceous. Phil. Trans. Roy. Soc. London B208: 389-440. Pl. 19-24. fig. 1-25. 1918.—This is a detailed morphological and anatomical account of the fructification of a new species of Bennettites (*B. Albianus*); and also the first detailed account of *Bennettites maximus*, described many years ago from externals only by Carruthers. The new species is particularly interesting, because it is the first petrified remains of the group which has been found in the Gault of Great Britain, and also because the cone is immensely larger than any hitherto described from any other horizon and contains innumerable small seeds. These are most beautifully petrified, and some of their details can be made out more perfectly than in any other species of *Bennettites* hitherto described.

The diagnosis given is as follows:

Fruit: Ovulate cone, not less than 70 mm. in diameter and probably much more.

Seeds: Innumerable, 600 or more in a single transverse section; five-ribbed, much elongated, torpedo-shaped, 5-6 mm. long, and about 1.2 mm. in greatest diameter. Seed with many-layered integument, enclosed in cupule-like extension of tubular cells of the stalk. Micropyles blocked by plug of nucellar tissue. Inter-seminal scales completely mutually fused round apex of seed and with seed tissues.

Embryo: With two cotyledons; radicle and hypocotyl relatively massive.

Scales: Externally covered by well-marked "plastid-layer" which runs round collar of micropyle.

Horizon: Gault (Albian).

This new species throws light on a variety of morphological points. *Bennettites maximus* shows various features of vegetative interest and also has extremely young cones, so young apparently that the male organs were not yet unfolded, and in the female cone were mere rudiments of the ovules. The species is re-diagnosed; and both are fully illustrated with text figures and photographic plates.—M. C. Stopes.

595. STOPES, M. C., AND WHEELER, R. V. Monograph on the constitution of coal, based on a paper read before the London Section of the Society of Chemical Industry. Pub. by H. M. S. Stationery Office for Dept. Sci. Industr. Research. 58: — — —. Pl. 1-3. 1918.—In small print and condensed form, this paper embodies the most complete chemical and palaeobotanical consideration of the composition of Bituminous Coal hitherto available. It is accompanied by a full bibliography, and endeavours to present in due proportion all the more important work hitherto done which bears on the actual constitution of coal—as distinct from its geological accumulation. The headings of the contents table are as follows: Definition of Coal; General Constitution of Coal; Accumulation of Coal-forming Material; The Action of Solvents; Destructive Distillation; Distillation at Different Temperatures; Liquid Distillates; Microscopical Evidence on the Constitution of Coal, (1) Earlier work, (2) The present research; "Ulmic Substances;" The Action of Reagents; Artificial Coals; Theories; Appendix, on Classification; Bibliography.—M. C. Stopes.

596. WALKOM, A. B. The geology of the Lower Mesozoic rocks of Queensland, with special reference to their distribution and fossil flora, and their correlation with the Lower Mesozoic rocks of other parts of Australia. *Proc. Linn. Soc. N. S. Wales.* 43: 37-115. 6 fig. 2 pl. 1918. —The Lower Mesozoic rocks comprise the Ipswich, Bundamba and Walloon series, the first two being of limited extent and the last probably of much wider extent. The bulk of the coal produced in Queensland comes from the Ipswich with subordinate beds in the Walloon and sandstones of the latter yield artesian waters. The Lower Mesozoic is estimated to be from 15,000 to 17,500 feet in thickness and is considered to be almost entirely of continental origin. The fossils are exclusively plants in the Ipswich and Walloon and insects in the former—the Bundamba series being unfossiliferous. The Ipswich is definitely referred to the late Triassic and is considered as possibly of Rhaetic age, while the Walloon series is referred to the Jurassic and its flora is compared with Liassic and lower Oolitic floras of other regions. The Lower Mesozoic was a time of similar anomalous continental deposits in other parts of Australia, as well as in India and South Africa, and their respective floras are of the greatest importance to students of the evolution and migrations of floras. The author discusses the geological history of the region which he illustrates by a series of paleogeographic maps covering the period between the close of the Paleozoic and the dawn of the Cretaceous.

597. WALKOM, A. B. Mesozoic floras of Queensland. Part II. The flora of the Maryborough (marine) Series. *Queensland Geol. Surv. Publ.* 262. 21 p. 2 pl. 1918.—The paper has a short introductory geological note by the Chief Government Geologist (Mr. B. Dunstan). Some 14 species are described, mostly from fragmentary specimens. They come from the Maryborough Marine Series which are generally regarded as of Lower Cretaceous Age, equivalent to the Rolling Downs Series of Western Queensland. There is no doubt that the plants occur in the marine beds as in some cases they are on the same specimen as marine shells.—*M. C. Stopes.*

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

598. ANDERSON, PAUL J. Rose canker and its control. *Massachusetts Agric. Exp. Sta. Bull.* 183: 11-46. Pl. 1-3, 11 fig. May, 1918.—A monographic treatment on the canker of roses caused by *Cylindrocladium scoparium* which has become serious on greenhouse roses in America. Experiments mostly on the life history of the fungus and control of the disease. —Another species of the same genus, *C. parvum* n. sp. is common on roses but a saprophyte. —Recommendations for control (1) selection of disease-free plants, (2) disinfection of pots, soil, benches, tools, etc., either by steam (over 50°C. for 10 minutes or more), hot water, or formaldehyde (at rate of 1 pint to 25 gallons and 2 gallons of the dilute solution per cubic foot of soil).—*P. J. A.*

599. BALLARD, W. R. Strawberry notes. *Maryland Agric. Exp. Sta. Bull.* 211: 51-76. Jan., 1918.—The relation of yield to percentage of stand is graphically shown. The degree of resistance to mycosphaerella leaf-spot is noted for 55 varieties.—*J. B. S. Norton.*

600. BLAKE, M. A. Some important points in fruit growing. *Rept. Maryland Agric. Soc.* 2: 109-117. Mar., 1918.—Gives recommendations for control of peach diseases due to *Exoascus*, *Cladosporium* and *Sclerotinia*, and the results of dusting trees in New Jersey.—*J. B. S. Norton.*

601. BRANDES, E. W. Anthracnose of lettuce caused by *Marsonina panattoniana*. *Jour. Agric. Res.* 13: 261-280. 4 fig. Pl. C, 20. April 29, 1918.—The disease described is said to occur chiefly on greenhouse lettuce and its development is favored by the conditions under

which it is grown. A brief summary of previous investigations is followed by an account of the present known distribution of the fungus, which is found in Europe as well as the United States. The symptoms and etiology of the disease are described. Inoculation experiments show that infection occurs in cool weather rather than in hot weather. Relation of moisture and dissemination of the organism is discussed. The trash from a previously diseased crop is regarded as the chief agent in carrying the disease over from year to year. The disease is spread in greenhouses by splashing of water in watering of plants. Sanitary methods such as destruction of trash of a preceding crop, rotation in the field and avoidance of manure containing lettuce refuse are recommended to reduce disease. Splashing of water from plant to plant or leaf to leaf is also to be avoided. Good ventilation is desirable. Spraying with Bordeaux mixture is only recommended as a last resort. [See Bot. Absts. 1, Entry 391.]-C. L. Shear.

602. BROOKS, CHARLES, AND D. F. FISHER. Irrigation experiments on apple-spot diseases. Jour. Agric. Res. 13: 109-137. 1918.—The writers give the distinguishing characteristics of bitter pit, Jonathan spot, drouth spot, cork, blister and rosy aphid stigmose. Detailed irrigation experiments are reported on bitter pit and Jonathan spot. Heavy irrigation greatly increased the amount of bitter pit. Medium irrigation followed by heavy late in the season resulted in more of the disease than continuous heavy irrigation. Heavy irrigation followed by light gave less bitter pit than light irrigation throughout the season. Large apples had more bitter pit than smaller ones but heavy irrigation increased the disease practically as much on small and medium sized apples as on large ones. Irrigation had but little influence on Jonathan spot. Observations are reported indicating that drouth-spot is due to sudden and extreme drouth and that cork, and blister are drouth effects confined to certain peculiar soil areas. [See Bot. Absts. 1, Entry 58.]-Charles Brooks.

603. BROWN, NELLIE A. Some bacterial diseases of lettuce. Jour. Agric. Res. 13: 367-388. Pl. E, 29-41. May 13, 1918.—Two bacterial diseases of lettuce are described as new in this paper; one found in South Carolina and Virginia, the other on greenhouse plants in Kansas. Isolation and inoculation experiments with both organisms are described in detail, also the relation of the organism to various media and temperature as well as moisture. The organism from South Carolina and Virginia lettuce is described as *Bacterium vitians* n. sp. The organism producing the disease on greenhouse lettuce from Kansas is described as *Bacterium marginale*, n. sp. This affects the margins of the inner whorl of leaves of immature plants chiefly. Subirrigation and good ventilation are the chief means recommended in preventing this disease.—C. L. Shear.

604. BRYAN, C. E. How many applications of spray material can be applied profitably in developing a peach crop? Rept. Maryland Agric. Soc. 2: 92-102. Mar., 1918.—Spraying five times cost 30 cents per tree, and an increase of half a basket per tree paid the entire expense.—J. B. S. Norton.

605. COONS, G. H. Seed tuber treatments for potatoes. Phytopath. 8: 457-468. 6 fig. 1918.—Field experiments to test the relative value of new and old methods of treating potato tubers for the control of scab (*Actinomyces*) and scurf (*Rhizoctonia*). There is no record that potatoes had been grown previously on the land. Untreated, scabby seed stock yielded low grade scabby (38 per cent) tubers; untreated seed stock free from scab yielded a good grade of tubers with 12 per cent scab. Scabby seed stock dipped in formaldehyde solution 1:240 for 15 minutes and 1.5 hours yielded a good grade of tubers with 0.7 and 1.1 per cent scab respectively, while seed stock free from scab and subjected to the same treatments yielded good tubers with 0.1 and 7.4 per cent scab, respectively. (The latter percentage is thought to be the result of an error.) Sprinkling seed stock with formaldehyde, 1:240, gave excellent control of scab and the method gives promise of practical application.—Bleaching powder, 5 per cent solution did not prove particularly effective in controlling scab.—Treatments for scurf with formaldehyde solution in the above-named dilutions and for the same

lengths of time and with mercuric chlorid, 1:1000, for 0.5 and 1.5 hours indicate that the latter material at either interval is more effective (the longer interval seems to have reduced the stand) but the percentage of scurf in the progeny from untreated scurfed seed stock is only 14.—Selection of seed stock free from sclerotia of *Rhizoctonia* yielded a progeny free from scurf.—Spraying scabby seed stock with concentrated formaldehyde, 15 cc. per bushel, gave control of scab but the "stand" was reduced, apparently by the treatment. Likewise treatment with hot (54° at start) mercuric chloride, 1:1000 for 5 minutes, gave control of scab and scurf but there seems to have been a reduction in "stand" from the treatment.—The organisms causing these two diseases apparently are introduced largely if not entirely on seed stock.

606. CORY, E. N. Control of insects and diseases of fruits and vegetables. Maryland Agric. Extens. Service Bull. 11. Feb., 1918.—A spray calendar.—*J. B. S. Norton.*

607. DOIDGE, E. M. Potato diseases: V. Bacterial wilt or Vroptootje. (*Bacterium solanacearum* Erw. Sm.) S. Afric. Fruit Grower 4: 236. June, 1918. [Also published as Bull. Local Series No. 49, S. Afric. Dept. Agric.]

608. DOIDGE, E. M. Potato diseases: VI. The *Rhizoconia* disease of potatoes (*Corticium vagum* var. *Solani* Burt.). S. Afric. Fruit Grower 5: 6. July, 1918.

609. EDSON, H. A., AND M. SHAPOVALOV. Potato stem lesions. Jour. Agric. Res. 14: 213-220. Pl. 24-26. July 29, 1918.—From isolation and inoculation experiments under greenhouse conditions several species of *Fusarium* as well as *Alternaria*, *Botrytis*, *Sclerotinia*, *Zygorrhynchus*, *Corethropsis*, *Phoma*, *Clonostachys*, and *Acrostalagmus*, are added to *Rhizoctonia* as causal organisms in the production of potato stem lesions, while several of the strains of *Rhizoctonia* tested were unable to attack the plants.—*H. A. Edson.*

610. ELLIOTT, CHARLOTTE. Bacterial oat blight. Phytopath. 8: 489-490. 1918.—Disease prevalent in north central states during a period of driving rains and cool weather. The plants were yellowish but resumed their normal blue-green color with the advent of dry, warm weather. Two diseases were observed the "halo" blight and "stripe" blight, but the former was by far the more common. The typical lesion of halo blight, when young, is an oval chlorotic area about a minute center of sunken dead tissue. The stripe blight lesion appears water soaked, somewhat translucent and usually extends as a long, rather narrow, sharply delimited streak between the veins. Absence of a halo and presence of glistening white flakes of exudate are diagnostic of streak blight.—Both diseases are caused by white bacterial pathogenes.

611. ELLIOTT, JOHN A. Storage rots of sweet potatoes. Arkansas Agric. Exp. Sta. Bull. 144: 1-12. Pl. 1, fig. 1-10. April, 1918.—Popular presentation describing principal storage diseases of the sweet potato with control measures, including construction and management of storage houses.—*J. A. E.*

612. ENLWS, ELLA M. A. A leafblight of *Kalmia latifolia*. Jour. Agric. Res. 13: 199-212. 2 fig., pl. 14-17. April 15, 1918.—A leafblight disease of mountain laurel found in Washington and vicinity is described. Brown areas are formed on the leaves which finally involve the entire plant. The causal organism was isolated from diseased leaves and the disease reproduced by inoculation experiments. Inoculation experiments with citrus, eggplant and apple gave negative results. The cultural characters of organisms in various media are given. The fungus is described as *Phomopsis kalmiae*, n. sp. [See Bot. Absts. 1, Entry 402.]—*C. L. Shear.*

613. FROMME, F. D. An automatic spore trap. Phytopath. 8: 542-544. Fig. 1. Oct. 1918.—One-half of a petri dish is attached to the shaft of the hour hand of a clock. Non-

nutrient agar is used. A frame work of thin metal strips set on edge, in the manner of a paddle-wheel, is forced into the solidified agar in the dish and divides its area into 12 sections. A metal cover, which fits over the rim of the clock case, has an aperture which exposes a sector equivalent to one-twelfth of the area of the dish.

614. GRAY, GEO. P. Economic toxicology. *Science* 48: 329-332. 1918.—Economic toxicology is that phase of toxicology that has to do with the relation of poisons to the control of pests detrimental to agriculture and to the public health.—History of the development of a chemical laboratory dealing exclusively with fungicides, insecticides, herbicides and "zoocides," their chemistry, manufacture and uses.—Description of a university course in the subject and an indication of the usefulness of treating the subject from the chemical standpoint.

615. GÜSSOW, H. T. Drouth injury to McIntosh apple. *Phytopath.* 8: 490-491. *Fig. 1.* 1918.—Fruit from British Columbia showed sunken, brown, lesions more or less confluent and irregular in shape and outline accompanied by vascular necrosis.—Very slight precipitation in the orchard from January to June 1917 is thought to be responsible.

616. GÜSSOW, H. T. Observations on obscure potato troubles. *Phytopath.* 8: 491-495. *5 fig.* 1918.—I. *Heterodera radiculicola* on tomato roots in the greenhouse became established on potato tubers when a potato was planted in the same pot. Only female eelworms were observed. The wormy potatoes were planted and the progeny was free from attack.

II. *Unfavorable storage conditions.* In badly ventilated storage cellars potato tubers show numerous bluish-black warts about 5 mm. in diameter. The warts show plainly on peeling and consist of hard brown cells.

III. *Leaf streak.* Potato leaves show a network of dark brown lines following the leaf veins, with a similar color feebly diffusing into the surrounding tissues. Affected leaves turn yellow and die. At times lesions occur in the leaf stalk. Tubers show no lesions but those from affected plants reproduce the trouble when planted. Streaks are similar to those sometimes found on plants affected with mosaic but there is no connection between the two diseases.—No organism has been found.

IV. *Mosaic disease transferred by inarching.*—Mosaic of potato could not be transferred by contact but was transmitted by an inarched graft. The disease did not appear in the grafted plant but each of the four tubers produced by it developed typical mosaic.

617. HESLER, L. R. Progress report on citrus scab. Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 30-31. 1918.—Preliminary report on the cause and control of citrus scab. Studies support the contention that the disease is due to the fungus *Cladosporium citri*. Copper and various sulfur and lime fungicides were employed in experimental groves. The opinion is expressed that treatment with lime-sulfur solution, supplemented by occasional applications of Bordeaux mixture, is worthy of thorough trial.—L. R. Hesler.

618. HODGSON, ROBERT W. A *Sterigmatocystis* smut of figs. *Phytopath.* 8: 545-546. Oct., 1918.—Badly infected figs can be detected by the discoloration of the outer skin. Mild cases are noted only on opening the fig when one or more streaks of a black gummy nature are observed. Ordinarily 3 to 10 per cent of the figs at Fresno, California, are affected, occasionally as high as 15 to 25 per cent. From artificial cultures and inoculations of pomegranate it is concluded that *Sterigmatocystis castanea* is the cause of the trouble. Some figs become infected while on the tree but it is thought that many are infected after they fall to the ground.

619. JOHNSTON, E. S. Report on nut tree investigations in Maryland. Maryland Agric. Exp. Sta. Bull. 218: 236-265. June, 1918. The death or survival of several hundred trees of *Juglans regia* and *Hicoria pecan* planted throughout Maryland in 1907-8 is tabulated, with notes on winter killing. Chestnut blight (*Endothia*) is reported in nearly all counties of the State.—J. B. S. Norton.

620. JOHNSTON, JOHN R. Enfermedades y plagas del cacao en el Ecuador y metodos modernos apropiados al cultivo del cacao. [Cacao diseases in Ecuador and methods of cacao cultivation.] [Review of: Rorer, J. B. Same title.] *Phytopath.* 8: 550. 1918.

621. JONES, FRED REUEL. Yellow leaf blotch of alfalfa caused by the fungus *Pyrenopeziza medicaginis*. *Jour. Agric. Res.* 13: 307-330. 6 fig. pl. D, 25-26. May 6, 1918.—The yellow-leaf blotch of alfalfa has only been known in the United States for the past two years according to the author, but is quite widely distributed. It is also said to occur in Argentina and Europe. Notes on its economic importance are followed by a description of the disease. The causal organism, *Pyrenopeziza medicaginis*, the stages in its life history and the synonymy are discussed. The conidial condition is found to be *Sporonema phacidioides* Desm. Detailed descriptions of the morphology and physiology of the organism and of the production of apothecia in pure culture are given, also the behavior on various culture media. Inoculation experiments with both conidia and ascospores are described. It is concluded that infection appears to take place only from ascospores. The fungus over-winters on dead leaves. Cutting infested leaves before the perfect stage of the fungus is developed appears to hold the disease in check. Methods of sanitation are recommended as control measures. The removal of the dead leaves as a sanitary precaution is suggested.—C. L. Shear.

622. LEE, H. ATHERTON. Early occurrence of citrus scab in Japan. *Phytopath.* 8: 551. 1918.—Lesions of citrus scab [*Cladosporium?*] found on *Citrus nobilis* collected in 1863 in Japan.

623. LONG, W. H. An undescribed canker of poplars and willows caused by *Cytospora chrysosperma*. *Jour. Agric. Res.* 13: 331-345. Pl. 27-28. May 6, 1918.—A canker of *Populus* and *Salix* is described as occurring in several Western states. The lesions are said to resemble sun-scald as it occurs on trunks of fruit trees. Pure cultures of the fungi were isolated from cankers and typical lesions of the disease produced by inoculating healthy plants. A description of pure cultures of the organism in the different culture media is given. The fungus is said to enter the host through wounds and dead branches. On poplars the disease in the Southwest is serious on trees growing at the outer limit of their range, also on trees planted on the streets and lawns, where they are subject to neglect and lack of water, also on trees that have been severely pruned, and in propagating beds. As control measures the selection of resistant species and an abundant water supply, with protection from mechanical injuries is recommended, also a careful inspection of nursery stock to avoid the distribution of disease.—C. L. Shear.

624. MACMILLAN, H. G. Sunscald of beans. *Jour. Agric. Res.* 13: 647-650. Pl. 64-66. June 17, 1918.—A spotting and streaking of bean pods and stems easily mistaken for bacterial blight is shown to be the result of sunscald. None of the varieties of beans observed was immune from the trouble which, though general in the district, is not destructive.—H. A. Edson.

625. MASSEY, LOUIS M. The diseases of roses. *Trans. Massachusetts Hort. Soc.* 1918: 81-101. Pl. 1-2. 1918.—Four diseases,—black spot (*Diplocarpon rosae*), powdery mildew (*Sphaerotheca pannosa rosae*), crown canker (*Cylindrocladium scoparium*) and crown gall (*Bacterium tumefaciens*)—are discussed in detail in regard to history and distribution, economic importance, symptoms, etiology, environmental relations and control.—Recommends application of powdered sulfur and arsenate of lead for the first two and soil disinfection, careful selection and sanitation for the last two. Author's treatment of crown canker about the same as in *Phytopath.* 7: 408-417; experiments described here for control of black spot and mildew the same as described in *Phytopath.* 8: 20-23.—P. J. Anderson.

626. MATZ, JULIUS. Some diseases of the fig. *Florida Agric. Exp. Sta. Bull.* 149: 3-10. Fig. 1-5. Aug., 1918.—Anthracnose (*Glomerella cingulata*); Leaf blight (*Rhizoctonia micro-*

sclerotia); Fig rust (*Physopella fici*); Root-knot; Sclerotium blight (*Sclerotium rolfsii*); Limb blight (*Corticium salmonicolor*); Dieback; Dropping of fruit.—C. D. SHERBAKOFF.

627. NEWCOMER, A. Will dusting produce as satisfactory results as spraying in developing a peach crop? Rept. Maryland Agric. Soc. 2: 102-109. Mar., 1918.—It will, with both peach and apple.—J. B. S. Norton.

628. NORTON, J. B. S., AND C. E. LEATHERS. Conditions detrimental to seed production. Maryland Agric. Exp. Sta. Bull. 216: 175-226. June, 1918.—The effects of hereditary defects and various environmental factors upon seed production are discussed in a general way and then in detail for each important crop and many minor crops. Special attention is given to seed diseases and seed disinfection, pollination difficulties and immature seeds. A bibliography of 347 titles is included. The results of experiments and observations are reported on the effect of cold, fermentation and fruit rot on tomato seed germination; disinfection of cabbage seed by chemicals and hot water; germination of immature tomato and cowpea seeds; germination of solanaceous seeds in manure; tomato seed production; and effect of fertilizers on tomato blooming. [See Bot. Absts. 1, Entry 747.]—J. B. S. Norton.

629. NORTON, J. B. S. [In: BALLARD, W. R., Strawberry notes.] Maryland Agric. Exp. Sta. Bull. 211: 74-75. Jan., 1918.—Notes on *Mycosphaerella* leaf-spot, *Sphaerotheca* and *Botrytis* diseases of strawberry, general disease control, and varieties resistant and susceptible to the leaf-spot.—J. B. S. N.

630. OSNER, GEORGE A. Stemphylium leaf spot of cucumbers. Jour. Agric. Res. 13: 295-306, 3 fig., pl. 21-24. April 29, 1918.—The author describes a leaf spot of cucumbers found doing more or less damage in the vicinity of Plymouth, Indiana, and Bowling Green, Ohio. The spots vary in size and outline. The center is light, yellowish brown, surrounded by a reddish brown border, sometimes nearly white. The causal organism was isolated from these spots and its relation to the disease demonstrated by successful inoculations. Four varieties of cucumbers, two of gourd and two of squash were successfully inoculated. The disease is regarded as hitherto unpublished and the causal organism is described as *Stemphylium cucurbitacearum* n. sp. It is shown that high temperatures and a dry atmosphere are unfavorable to the development of the fungus. The organism lives over winter on diseased plants. Spores are disseminated by wind, rain, insects, etc. Preliminary experiments give promise that the disease may be controlled by Bordeaux mixture. Sanitary measures such as destruction of vines and crop rotation are recommended. [See Bot. Absts. 1, Entry 433.]—C. L. Shear.

631. PIERCE, ROY G. Additional list of state and national quarantines against the white pine blister rust. Phytopath. 8: 484-486. 1918.—Supplements and corrects original list given in: Phytopath. 7: 319-321. 1917.

632. PRATT, O. A. Soil fungi in relation to diseases of the Irish potato in southern Idaho. Jour. Agric. Res. 13: 73-100. 4 fig., pl. A-B. April 8, 1918.—Fungi, including five new species of *Fusarium* isolated from desert soils are reported in detail. *Fusarium radicolica*, *Fusarium trichothecioides* and *Rhizoctonia solani*, known to be parasitic on the Irish potato, were isolated from Idaho soils known never to have been cropped with potatoes. The results of planting disease-free seed potatoes on cultivated lands never in potatoes, and on virgin desert land substantiate the opinion that land, previously cropped with such crops as alfalfa, clover, and grain, is better adapted to the production of disease-free potatoes than virgin desert land. [See Bot. Absts. 1, Entry 436.]—H. A. Edson.

633. RATHBUN, ANNIE E. The fungus flora of pine seed beds. Phytopath. 8: 469-483. 1918.—Species of *Mucor*, *Penicillium*, *Aspergillus*, *Rhizopus nigricans*, *Zygorrhynchus vuillemini*, *Trichoderma koningi* and some others were found at various depths from 1 to 44 in.

"With the exception of *Fusarium* no fungus known to cause damping off has yet been isolated from the soil of the nursery." The parasitism of "*Fusarium*" is not shown.—"Grubs and earthworms are carriers of the spores of soil fungi."

634. REDDICK, DONALD, AND VERN B. STEWART. Varieties of beans susceptible to mosaic. *Phytopath.* 8: 531-534. Oct., 1918.—The common snap and shell varieties of *Phaseolus vulgaris* have been tested. Practically all are susceptible. White marrow is immune or highly resistant. The common Navy Pea is most susceptible but a pea bean, variety Robust, is found to be immune. Evidence is presented indicating that field selection of disease-free plants is not effective in eliminating the disease.

635. REYNOLDS, ERNEST SHAW. Two tomato diseases. *Phytopath.* 8: 535-542. 2 fig. 1918.—(1) Leaf chlorosis. Definite white areas or spots appeared on certain leaves of variety Bonny Best. The disease did not spread to other plants and only rarely did new leaves on affected plants develop the trouble. It could not be transferred to other plants by rubbing, and external applications of iron salts did not lessen it.—Theoretical discussion contains remarks on "the so-called mosaic disease." (2) Blossom end rot. Symptoms are described in detail. Attempts to find a causal organism failed. "It would not be surprising to find that several different and independent causes acting upon a uniform tissue, produce results of generic similarity and hence give rise to a group of diseases all at present included under one name."—Discussion of conditions of infection—Disease may be caused by an ultra-microscopic organism which infects at time of pollination.

636. ROBERTS, JOHN W. AND LESLIE PIERCE. Apple bitter-rot and its control. U. S. Dept. Agric., Farmers Bull. 938, 1918. 14 p., 3 fig.—Gives a brief statement in regard to the occurrence, characteristics, and cause of bitter rot but is devoted largely to the questions of infection and control. The disease is reported to be carried through the winter in mummied apples, in bitter-rot cankers and in cankers in which the bitter-rot fungus is a secondary infection. In the Eastern States the disease seems to pass the winter largely in the mummies but in badly infected orchards of the Middle West, the cankers often surpass the mummies in importance. The spores are carried by rain drops, by insects and probably also by birds. In the average orchard in bitter-rot sections the disease can be controlled by three or four sprayings with Bordeaux mixture but in orchards where the disease has been very destructive for a number of years it is often necessary to remove the overwintering sources of infection in order to secure complete control. A list of apple varieties is given with reference to their relative susceptibility to bitter rot.—Charles Brooks.

637. ROBERTS, JOHN W. The sources of apple bitter rot infections. U. S. Dept. Agric. Bull. 684: 1-26. 5 pl. 1918.—A detailed report of orchard experiments is given and the following conclusions are drawn: Bitter rot is due to the fungus *Glomerella cingulata*. The mummies are the chief sources of infection; both those on the tree and those on the ground being important. The fungus appears to live over but one year in a mummy. In cankers on young, vigorous branches the fungus does not survive till the next season; in cankers on older twigs of susceptible varieties it may survive for several years. Different varieties of apples show different degrees of susceptibility to the cankers. The fruit of a variety may be susceptible to rot and the limbs practically immune to cankers. The fungus can be found in cankers and dead wood due to various causes. It is able to infect many plants other than the apple.—Charles Brooks.

638. ROSENBAUM, J., AND G. B. RAMSEY. Influence of temperature and precipitation on the blackleg of potato. *Jour. Agric. Res.* 13: 507-513. June 3, 1918.—From a study of climological data and soil temperature records in correlation with outbreaks of the blackleg disease of the potato, caused by *Bacillus phytophthorus*, the conclusion is drawn that high temperature and low precipitation tend to diminish the severity of the disease, while low temperature and high precipitation favor its development. No evidence could be obtained

that the organisms overwinter in a virulent condition either in soil or buried tubers in Maine or in Virginia.—H. A. Edson.

639. SHEAR, C. L. An outline of the history of phytopathology. [Review of: Whetzel, Herbert H. (Same title.) Philadelphia, 1918.—See Bot. Absts. 1, Entry 377.] Phytopath. 8: 487-488. 1918.

640. SIEGLER, E. H. A brief analysis of the dusting method. Rept. Maryland Agric. Soc. 2: 86-98. Mar., 1918.—The history of dusting, formula for arsenate of lead and sulfur dusts for fruit insects and diseases, methods of application and results are given. Peach scab (*Cladosporium*) was controlled, apple diseases not.—J. B. S. Norton.

641. STEVENS, F. L., W. A. RUTH AND C. S. SPOONER. Pear blight wind borne. Science 48: 449-450. 1918.—Branches of pear trees were enclosed in insect proof cages. No insects were found in the cages but the enclosed twigs blighted to the same extent as those not so treated. "The only tenable hypothesis is that wind was the chief agent of transmission."—Supporting evidence lies in the fact that insects were not abundant in the orchard and that no insects have been observed feeding on the exudate, of *Bacillus amylovorus*, from cankers.

642. STEVENS, H. E. Florida citrus diseases. Florida Agric. Exp. Sta. Bull. 150: 15-110. Fig. 6-54. Aug., 1918.—The bulletin is intended to bring together information relating to all citrus diseases in Florida. Besides parasitic diseases it treats also "a few other diseases and injuries where such are common, unusual or likely to be confused with some other diseases." Part of the bulletin gives limited information on the care of the grove, fungicides, spraying and antiseptics. The following diseases and injuries are treated; withertip, anthracnose, tear stain and bloom blight all due to *Colletotrichum gloeosporioides*; foot-rot (*Phytophthora terrestris*); gummosis and its psorosis type, cause undetermined; blight, cause undetermined; scaly bark (*Cladosporium herbarum* var. *citricolum*); citrus canker (*Pseudomonas citri*); scab (*Cladosporium citri*); citrus knot (*Sphaeropsis tumefaciens*); several leaf spots, cause undetermined; sooty mold, name of fungus not given; (*Septobasidium pedicellatum*) algal leaf and bark spot (*Cephaleuros virescens*); lichens, names not given, causing leaf and bark spots; frenching, probably caused by lack of humus in the soil or sometimes by lightning, or poor drainage; black melanose or greasy spot, cause undetermined; dodder (*Cuscuta* sp.); cassytha (a plant in its habits similar to dodder) sunscald, lightning and cold injuries.—C. D. Sherbakoff.

643. TEMPLE, C. E. Report of the state pathologist. Rept. Maryland Agric. Soc. 2: 161-169. Mar., 1918.—Reports the spread of plant diseases favored by the wet weather in 1917; 4000 bushels of seed wheat treated for smut; inspection and quarantine against white pine blister rust, not yet found in Maryland; certification of 10,000 bushels of potatoes for the Western Maryland seed potato growers; the use of two *Fusarium*-resistant tomato selections and the production of seed of the same on a large scale; detailed discussion of successful experiments in spraying for *Septoria* tomato blight. Other diseases discussed are pear and apple blight, peach yellows, bacterial leaf spot of peach and *Phoma persicae*.—J. B. S. Norton.

644. THOMAS, H. E. Vegetable diseases. Vanilla diseases. Citrus diseases. [In: Report of the Plant Pathologist.] Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 28-30. 1918.—Brief notes on vegetable diseases as follows:—A wilt disease of beans (caused by an undetermined Phycomycete); lima bean rust (caused by *Uredo concors*, and sometimes followed by *Isariopsis griseola*); bean powdery mildew (caused by *Erysiphe polygoni*); which was easily controlled by dusting with equal parts of lime and flowers of sulfur; cabbage black rot (caused by *Ps. campestris*); tomato downy mildew (caused by *Phytophthora infestans*); leaf mold (caused by *Cladosporium fulvum*); and wilt (caused by *B. solanacearum*). Other less important disease-producing organisms observed: *Cercospora beticola* on beets, *Plas-*

mopara cubensis on melons, *Cercospora hibisci* on okra, *Cercospora personata* on peanut, *Phytophthora infestans* on potato, *Cercospora cruenta* and *Isariopsis griseola* on bean.—Spotting of vanilla leaves observed. Chiefly due to the alga, *Mycoidea parasitica*, and occasionally to *Gloeosporium rufomaculans*.—A root disease, apparently new, is mentioned. A species of *Fusarium* repeatedly isolated; infection experiments under way.—The withertip fungus (*Colletotrichum gloeosporioides*) of citrus, and the citrus scab fungus (*Cladosporium citri*) were active during the year. Cereal diseases observed: leaf spot of corn, due to *Helminthosporium inconspicuum*; rice blast, caused by *Piricularia oryzae*, and wilt of wheat, caused by *Sclerotium rolfsii*.—L. R. Hesler.

645. WHITE, T. H. Fertilizing and cultural experiments with Irish potatoes. Maryland Agric. Exp. Sta. Bull. 215: 151-174. Mar., 1918.—Injury to the seed piece from excess of fertilizer in the row, sulfur and slaked lime is reported, while raw phosphate rock and, especially, dry Bordeaux on the seed piece gave a better stand. Acid phosphate and wet germicides on the seed piece were injurious. The effect of cutting, storage and source of seed on stand and yield are described.—J. B. S. Norton.

646. WICKS, W. H., AND C. H. HEARD. Bean growing in Arkansas. Arkansas Agric. Exp. Sta. Circ. 41: 1-4. April, 1918.—Popular presentation giving brief report of varietal tests and control of common diseases.—John A. Elliott.

647. WILSON, ORVILLE TURNER. A storage fermentation of dasheens. Phytopath. 8: 547-549. 1 fig. Oct., 1918.—"Tubers" of *Colocasia esculenta* were found in which the tissue was of the consistency and appearance of a commercial moist yeast culture and which emitted an odor of fermentation. A yeast was isolated which on inoculation set up fermentation in healthy tubers. "True parasitism of the yeast is not established by the observations but rather its capacity to initiate and carry on a fermentation in the injured tissues, which in turn spreads to surrounding healthy tissues."

648. WOLF, FREDERICK A. Intumescences, with a note on mechanical injury as a cause of their development. Jour. Agric. Res. 13: 253-260. 1 fig., pl. 18-19. Apr. 22, 1918.—Following a brief introductory discussion of plant intumescences in general and theories regarding their cause, an outbreak on cabbage, following a severe wind storm, is described and attributed to the stimulus resulting from mechanical injury occasioned by wind-blown sand. The proximate cause is believed to be a problem of absorption due to a heightened hydration capacity of the cell colloids resulting from acid production by oxidation. [See Bot. Absts. 1, Entry 735.]—H. A. Edson.

PHARMACOGNOSY

HENRY KRAEMER, Editor

649. [ANONYMOUS.] A possible new source of thymol. Agric. News [through Chem. and Druggist 90: 815. 1918].—*Ocimum viride*, native of West Africa and abundant in Sierra Leone, has been cultivated experimentally in the Seychelles. The green shoots from plants eight months old yielded 0.45 per cent of oil which contained 52 per cent of thymol. It was estimated that the yield of oil per acre from one cutting would be 35 pounds and that four or five cuttings could be made annually. It is suggested that the cultivation of this plant be continued in Seychelles and be introduced into the West Indies.—E. N. Gathercoal.

650. ANONYMOUS. Tunis caraway. Chem. and Druggist. 90: 796. 1918.—Holland, which cultivates 20,000 acres of caraway, normally supplies the London market with caraway for medicinal and culinary purposes. Due to the recent abnormal shortage of this article in the London market, Indian dill-seed (*Peucedanum Sowa*) has been sold as a substitute but is very inferior to the Dutch caraway. Mogador caraway from Morocco is suitable only

for distilling oil for perfuming soap. "Levant" caraway from Tunis, a novelty in the London market, is the most acceptable substitute for the Dutch article so far offered. North Russian caraway is especially suited for the flavoring of the liqueur known as k  mmel but yields very little volatile oil.—Caraway cultivation as an industry of the United Kingdom is urged, and the Board of Agriculture is requested to ascertain the best varieties of *Carum Carvi* and the most favorable conditions of soil, moisture, fertilizer, etc., for insuring the largest yield of volatile oil for use in soap-manufacture, of oil containing the most carvone for chemical and medicinal uses and of oil possessing the finest flavor for the manufacture of liqueurs.—*E. N. Gathercoal.*

651. [ANONYMOUS.] Report of Agricultural Department of Dominica: West Indian oil of bay. Kew Bull. No. 5, p. 158. May, 1918.—West Indian bay oil is distilled from the leaves of *Pimenta acris* Kostel. and is used in the preparation of bay rum. The leaves of two varieties of *P. acris* known locally as "Bois d'Inde Citronelle" and "Bois d'Inde Anise" are frequently admixed with the leaves of the true bay to the great detriment of the oil subsequently distilled. The oil from the "Citronella" variety (*P. acris* var. *citrifolia*) contains citral and has the flavor of lemon. Why the oil from the "Anise" variety does not reach the desired standard is not yet clear.

The leaves have been submitted to Kew but no distinctions can be found between the three varieties except that the crushed leaf of *citrifolia* possesses the lemon-like odor.

The varietal forms intermingle in extensive wild growths near the coasts of many of the West Indian islands and the leaves are gathered indiscriminately. Much harm has already resulted to the bay oil industry and it is a matter of great concern to the distillers that either some method be determined for distinguishing the undesirable leaves or that plantations of the true *P. acris* be established.—*E. N. Gathercoal.*

652. [ANONYMOUS.] Eucalyptus oil. Chem. and Druggist 90: 811. 1918 [Editorial].—The eucalyptus oil industry in Australia is of an importance comparable to the lemon oil industry of Italy. Both play an important part in the economic welfare of the respective countries. Although there are 300 species of eucalypts in Australia less than twenty-five of these can be utilized for their oil. *E. Macarthuri* is now receiving special attention in Australia as it is a very rapid grower and its oil contains 60 per cent of geranyl acetate.

The annual production of the oil (nearly a million pounds) has been well maintained within recent years but, owing to restricted transportation, large stocks have been accumulating which will soon compel distilleries to close, while in the London market a shortage of the oil is experienced with a consequent rise in price.—*E. N. Gathercoal.*

653. [ANONYMOUS.] Saponiferous plants as soap substitutes in Germany. Seifenfabrikant 37: 374. 1918. [Through J. Soc. Chem. Ind.]—Natural soap substitutes, occurring in certain plants are recommended in view of the shortage of fat and soap. The soapwort (*Saponaria officinalis*) contains in the leaves, stems and especially in the roots abundant amounts of saponin, producing a thick soap lather in water. The fresh roots are thoroughly washed, dried, and reduced to as fine a powder as possible, which is used directly as such for the hands or with soda for linen. Other common plants, although their saponin content is lower than that of soapwort, can also be used, namely ragged robbin (*Lychnis Flos-cuculi*), bachelor's button (*Melandryum* species), flaxweed (*Silene* species), corn cockle (*Agrostemma Githago*), rupture wort (*Herniaria glabra*), etc.—*Arno Viehoever.*

654. [ANONYMOUS.] Japanese agar agar. Chem. and Druggist 90: 50. June, 1918.—Agar is prepared by the same primitive methods in vogue for the last three centuries; though recently a new company has been projected to combine many small concerns and develop a real factory industry. Most of the product is exported, the exports being two to three million pounds. China is a large buyer and before the war Germany also led. Since the war Great Britain has been first but now the United States leads in the amount purchased.—*E. N. Gathercoal.*

655. [ANONYMOUS.] Valerian root. Chem. and Druggist 90: 50. June, 1918.—The demand for this drug far exceeds the supply in England, as it is extensively used in the treatment of shellshock. The price has trebled since the war began. Indian valerian is as valuable as English-grown valerian and more agreeable to the taste. The Japanese valerian has an unpleasant flavor and gives a different taste to the tincture. English herb-growers should increase their plantings using all the available suckers this season. Other drugs such as *Scutellaria* and *Cypripedium* might be used as nerve-tonics.—E. N. Gathercoal.

656. [ANONYMOUS.] The castor oil industry. Chem. and Druggist 90: 43. June, 1918.—British production from castor beans imported from India is from 3500 to 4000 tons per month but the government uses practically all of this for motor lubrication. None of the finest water-white medicinal oil is found in pharmaceutical trade for only neutralized second-grade of oil is released by the Castor Oil Committee and this is rationed in amount far below the needs of the trade.

The demand in the United States is also very heavy and here an effort has been made to plant 200,000 acres with Indian seed, government contracts being made with growers to take the seed at \$3.00 to \$3.60 per bushel.

India exported in 1916-17, 1,723,000 gallons of castor oil and a large quantity of seed, though no figures are available as to the actual quantity of castor oil produced in India. It is used very extensively as a burning oil in lamps and as a lubricant.

In the West Indies it is estimated that 100,000 acres have been planted with Indian seed and in Brazil its cultivation has been largely extended. E. N. Gathercoal.

657. [ANONYMOUS.] Herb crops. Chem. and Druggist, 90. June, 1918. Mention is made of satisfactory crops at Mitcham of marshmallow, southernwood, tansy, hyssop, red sage, balm and chamomile. Rue, peppermint, sculcap and pennyroyal are thin crops. Thyme, mint, sage and savory are very satisfactory.—E. N. Gathercoal.

658. ASAHINA, YASUHIKO, AND SENTARO MAYEDA. The Korean Ko-Woren. Yakuga kuzasshi. March, 1918. [Through Jour. Pharm. et Chim.]—The Korean drug represents the rhizome of *Jeffersonia dubia* Benth. and Hook. (*Berberida ceae*) while the Chinese drug of the same name is derived from *Picrorrhiza Kurrooa* Royle (Scrophulariaceae). The anatomy of the *Jeffersonia d.* rhizome is described in detail and the resemblance to the *hydrastis* rhizome mentioned. No berberine was found, confirming thus in a way Gordin's results with the American species *Jeffersonia diphylla*, in which he, contrary to other authors could not find any berberine. Another alkaloid however was isolated, yielding an amorphous carbonate, melting towards 210°C. with decomposition, sol. in water, less sol. in alcohol and acetone and not at all in ether. The picrate was amorphous, the double salts with gold or platinum chloride were confusedly crystalline.—Arno Viehoveer.

659. BACHARACH, ALFRED LOUIS. Two plant products from Columbia. Analyst 43: 289. 1918.—I. Oil of *Jessenia polycarpa* Karst.—This oil is from the nut of the "sejen" or "unamo" palm, known locally as "aceite de sejen" (oil of palm). In the llanos of San Martin it is considered to be superior to cod-liver oil for use in chest and lung complaints. It is also used in cooking. It is refined locally and finds a ready sale in the drug stores of Bogota and other Columbian towns.—The oil is pale yellow, has a slight fluorescence and not unpleasant odor; somewhat refractive and does not become rancid with time. It reacts similar to olive oil in the "elaidin" test and is miscible in all proportions with ether, acetone, petroleum spirit, light petroleum, benzene, chloroform, carbon tetrachloride and ethyl acetate but not with water, absolute alcohol, 95 per cent rectified spirit and glacial acetic acid. A table shows the various analytical values as compared with those of olive oil. The only notable difference is in the iodine values of the oils. The oil could, presumably, be used for all purposes for which olive oil is employed.

II. Seeds of *Caryodendron Orinocense* Karst.—These seeds are used at Villarvicencio, in the llanos of San Martin, where they are roasted and eaten, being known locally as "Tacay."

They sell readily at about 3 d. per pound. The seeds have a greyish-brown brittle husk, and are of a whitish color, fairly tough, 23 to 27 mm. long, 15 to 20 mm. broad and weigh about 3.1 gm.—The composition is similar to that of Walnuts. The analytical values of the ether extract are given. The taste of the roasted nuts is similar to burnt almonds.—C. J. Zufall.

660. BALJET, M. H. Localisation of the active glucosides in the leaves of the genus *Digitalis*. Schweiz. Apoth. Ztg. 56: 247. 1918. [Through Jour. Pharm. et Chim.]—With means of sodium picrate reagent (one drop of 1 per cent picric acid sol. mixed with one drop of 10 per cent sod. hydroxide sol.) applied to sections, the cells containing the glucosides are colored orange within 1 or 2 minutes. In all the species of *Digitalis* studied, including *D. purpurea*, *lutea*, *ambigua*, the glucosides were thus located in the epidermal cells, the non-glandular hairs, in the endodermis of the vascular bundles and sometimes in the subepidermal collenchyma. The leaf margin (epidermis and endodermis) gave the strongest reaction, the base of the petiole only a very faint one. In many leaves the upper epidermis reacts, the lower not, supporting thus—according to the author—the viewpoint that glucosides are waste products.—Arno Viehoever.

661. BALLARD, C. W. Wild *Anthemis*, a possible *matricaria* adulterant. Jour. Amer. Pharm. Assoc. 7: 952-4. 1918.—Flowering heads of the wild grown *Anthemis nobilis* Lin. were offered as Chamomile or Spanish Chamomile. They contain more volatile oil and bitter principles than the cultivated and are probably more active, but more liable to produce nausea. As the one-time official Roman Chamomile was the cultivated flowering head, the wild product bears little resemblance to it; in fact, it has a greater resemblance to the German Chamomile, *Matricaria Chamomilla* Lin. The distinguishing characters showing the difference between these three drugs are summarized and the powdered drug of Wild *Anthemis* is illustrated and its histology given in detail.—O. A. Farwell.

662. BOHRISCH, P. The sulphuric acid test for *Strophanthus* seeds. Pharm. Ztg. 63: 318. 1918. [Through Jour. Soc. Chem. Ind.]—Of the various modifications proposed for the carrying out of the test the following procedure is recommended: Thin cross-sections of the seeds (*Str. Kombé*), placed on an object glass and treated with ether to remove the fat, are covered with one drop of sulphuric acid, containing $\frac{1}{4}$ of its weight of water. The deep green coloration, indicating the presence of strophanthin, should, especially when some magnification is used, be observable in the endosperm and at least the outer portions of the embryo. When big sections, seeds cut in half, were used, the results of the test were very variable and indefinite.—Arno Viehoever.

663. COCKING, T. TRUSTING, AND JAMES D. KETTLE. The evolution of balsam of tolu. Pharm. Jour. 101: 40. 1918.—The method of the British Pharmacopoeia (1914) for the estimation of the aromatic acids in storax would not be used for the estimation of these acids in balsam of tolu. However, boiling out the aromatic acids with magnesium oxide and water, in the presence of a small quantity of xylene to soften the resinous matter was found to satisfactorily extract these acids from balsam tolu.—A table of analytical data is appended exhibiting for fourteen samples the acid value, ester value, saponification value, percentage of free and combined benzoic and cinnamic acids, etc. The percentage of total balsamic acids present ranged from 32.66, to 47.56 with the exception of two samples containing 24 per cent, which were probably sophisticated. These two samples also were low in ester value but were high in acid value and saponification value. It is recommended that, in the pharmacopoeia, limits of ester value be adopted instead of saponification value.—E. N. Gathercoal.

664. EWING, C. O. Karaya gum, a substitute for tragacanth. Jour. Amer. Pharm. Assoc. 7: 787-90. 1918.—Shows that the relative values of commercial gums depends upon the purposes to which they are best suited, those suitable for pharmaceutical requirements being rated amongst the most valuable. One of the most valuable is gum *Tragacanth*, official in the U. S. P. IX and defined as the dried gummy exudate from *Astragalus gummifer* Labil.

or from other Asiatic species of *Astragalus*. Substitute gums have been derived from *Sterculia urens* Roxb., *S. villosa* Roxb., *S. Tragacantha* Lindl., *Cochlospermum Gossipium* DC. or from other species of these genera. These gums are known under a large number of vernacular names in India, one of them being *Karaya*. It occurs in irregular, rounded, translucent lumps of a pale buff color, without the ribbon-like bands characteristic of true *Tragacanth*, but in the powdered state may readily be mistaken for it. The volatile acidity of gum from *Cochlospermum*, when hydrolized with phosphoric acid and distilled, corresponds to about 14 or 15 per cent of acetic acid; of *Sterculia* to about 16 per cent; and of *Astragalus* to only 2 or 3 per cent. *Karaya* gum is considered to be about equal to true *Tragacanth* as an emulsifying agent, and is used extensively in India as a substitute for it; the author, however, thinks that when used as an emulsifying agent about $\frac{1}{2}$ to $\frac{1}{3}$ more should be used; he also suggests that a solution could be used as a substitute for glycerin.—O. A. Farwell.

665. EWING, C. O., AND J. F. CLEVINGER. So-called Syrian alkanet, *Macrotomia Cephalotes* DC. Jour. Amer. Pharm. Assoc. 7: 591-4. 1918.—This is a root much longer (20 to 40 cm.) and thicker (2 to 5 cm.) than the true Alkanet, *Alkanna tinctoria* Tausch, and is many-headed while the true is few-headed; the color is black-violet, somewhat metallic, that of the true being a dull maroon; it is distinctly spirally twisted. The Syrian was freer from sand but true Alkanet had a fine sprinkling of it. The coloring extracts of each are very similar in nature and consist of at least two chemical substances. The coloring extract in the Syrian is present in much larger quantities than in the true and, as it is of equal tinctorial strength, may be considered to be a valuable substitute.—O. A. Farwell.

666. EWING, C. O., AND J. F. CLEVINGER. *Piptostegia* root, *Piptostegia Pisonis* Mart., so-called "Brazilian jalap." Jour. Amer. Pharm. Assoc. 10: 855-858. 1918.—Material offered for entry as "Jalap" proved upon investigation to be the root of *Piptostegia Pisonis* Mart., referred to by Holmes as "the ordinary Jalap from Brazil." A macroscopical description of the root is given, as also several photographs of transverse sections.—Preliminary experiments by the authors confirm Passmore's report that "over 20 per cent of resin answering to all of the B. P. and U. S. P. VIII tests for the resin of true or Vera Cruz jalap, but only 0.85 per cent is soluble in ether," but indicates that the drug possesses considerable cathartic power, yet quite dissimilar to that of true jalap. Assay of the root, according to U. S. P. method yielded 23 per cent of resin. The specific rotation proved to be -48.5 compared to that of true jalap, which is reported to be in the neighborhood of -36 to -37 . A comparison of the resin contents and specific rotations is included in a tabulated report on several of the Convolvulaceous roots, e.g., *Piptostegia*, Jalap, Scammony, Mexican Scammony and Morning Glory. A marked dissimilarity of *Piptostegia* root is noted, especially compared with that of Jalap. The results of the pharmacological experiments are also discussed.—A. Hogstad, Jr.

667. FAES, M. H. Pyrethrum and its culture. Schweiz. Apoth. Ztg. 56: 429. 1918. [Through Jour. Pharm. et Chim.]—The successful plantation in Switzerland is discussed of plants, yielding insect flowers, grown from seeds of *Chrysanthemum cinerariaefolium*, originated in Dalmatia and neighbouring states. The cultivation, collection, etc., are described in detail. The material obtained was of the same quality as that grown in the countries of foreign origin. Faes recommends the application of insect powder, suspended in black-soap sol in the fight of *Cochylis*, destructive to vineyards, and points out that the action of pyrethrum on the eggs is more effective than nicotine in certain respects.—Arno Viehoever.

668. FAES, H. Cultivation of insect flowers. Schweiz. Apoth. Ztg. 56: 429. 1918.—True Dalmatian insect-flowers, *Chrysanthemum cinerariifolium*, are now being cultivated in Switzerland. Seed from Austria, Hungary and Dalmatia has been tried since 1912. By 1917, 97 plantations carrying 25,000 plants had been established. The seed from spring flowers sown in shallow trenches in rather stony soil with a south aspect will produce hardy plants that first bloom about mid-June of their second year. The flowers are gathered before

expanding thus furnishing the "closed" and "half-open" commercial varieties. An aqueous extract of the flowers is used in black-soap solution as a spray for vineyards. The commercial demand for the flowers is steady and the grower is certain of a market for his product.—*E. N. Gathercoal.*

669. FARWELL, O. A. Brazilian jalap and some allied drugs. Jour. Amer. Pharm. Assoc. 10: 852-855. 1918.—According to the deductions made by the author, the proper binomial for Brazilian Jalap is *Operculina macrocarpa* (Linn.) Urban. In Brazil the drug is commonly known as *Batata de purga* and *Batata purgante*. *Tapioco de Purga* is a product derived from the root. The generic characters of *Operculina* and a description of the root follow.—An examination of material procured from London agreed in all points with that of the description, and in transverse section bears resemblance to the roots of Mexican Scammony, Poke and, more pronounced, to those of White Bryony. These resemblances are readily noted by a comparison of the photographs included in the article.—The author goes on to describe the root, yielding *Resina Drastica*, which is of unknown origin and Mexican Scammony derived from the tuberous roots of *Ipomoea Orizabensis* (Pell) Ledenois, which is known as Male or Orizaba Jalap. From the resemblances of the root yielding *Resina Drastica*, to that of Brazilian Jalap and Mexican Scammony, the author hazards the guess that it is from some plant closely allied to them, consequently from the Convolvulaceae.—*A. Hogstad, Jr.*

670. HILL, C. A. Supplies of vegetable drugs. Presidential address before British Pharmaceutical Conference, 1918. Pharm. Jour. 101: 19. 1918.—A *résumé* of British drug stocks after four years of war, with the whys and wherefores of increased prices, shortages, etc. About forty principal drugs are dealt with.—*E. N. Gathercoal.*

671. HILL, A. W. The genus *Strychnos* in India and the East. Kew Bull. 1917. Page 121.—Ninety-two species are described. Those of pharmacognostical interest besides *S. Nux-vomica* and *S. Ignatia* are *S. colubrina*, Linn., yielding *Lignum Colubrinum* of mediaeval pharmacy; *S. quadrangularis*, Hill, from which the Malayan arrow-poison "Spoh aker" is obtained; *S. Gaultheriana*, Pierre, which supplies Hoangnan Bark, introduced from Cochin China as remedy for leprosy, and *S. Nux blanda*, Hill, of Burma, which produces a seed very similar in appearance to *Nux vomica* but devoid of strychnine or brucine. *S. Nux-vomica* appears to be a variable plant and it would be useful to submit authentic seeds of the different varieties and of species allied to it, to determine which are the richest in strychnine.—*E. N. Gathercoal.*

672. HOLM, THEO. Medicinal plants of North America. Merck's Rept. 27: 115-7, 168-70. 1918.—The author discusses both *Juglans nigra* Lin. and *Juglans cinerea* Lin., contrasting these with *Carya* and *Platycarya* and giving a general botanical description with illustrations of the flowers and of the histology of the root. The internal structure of the vegetative organs is described in detail. The roots of the two species are identical as regards structure and the stems of *J. cinerea* differ from those of *J. nigra* only in the stereome which represents almost closed sheaths and being interspersed with large, very thin-walled, and porous sclereids.—*O. A. Farwell.*

673. SCOVILLE, W. L. Brazilian jalap. Jour. Amer. Pharm. Assoc. 9: 785-787. 1918.—An examination of Brazilian Jalap, *Piptostegia Pisonis*, showed that the resin from this drug is a complex body of glucosidal nature, similar in chemical character and contains constituents of like character to that of *Exogonium Purga*. The resin meets the requirements of the U. S. P., with the exception of solubility in water and acid number. The yield is three to four times as great and the physiological action is similar. Detailed results of the examination are given.—*A. Hogstad, Jr.*

674. SPIEGEL, L., AND A. MEYER. Saponin from mowrah seed. Ber. Deutsch. Pharm. Ges. 28: 100. 1918. [Through Jour. Chem. Soc.]—The saponin mowrin, formerly isolated

from mowrah seeds (*Bassia longifolia*) was found to be a mixture of 2 substances, the main one, $C_{42}H_{68}O_{25}$, being more soluble in alcohol and yielding upon hydrolysis laevulose, arabinose and mowric acid. This acid is a mixture of a crystalline mowragenic acid, $C_{19}H_{23}O_5$, and an amorphous mowragenic acid, $C_{19}H_{30}O_{16}$. Careful hydrolysis with dilute acetic acid yielded an intermediate pentoside, $C_{29}H_{50}O_{16}$.—Arno Viehoveer.

675. VIEHOEVER, A., C. O. EWING AND J. F. CLEVINGER. Commercial viburnum barks and preparations. Jour. Amer. Pharm. Assoc. 7: 944-52. 1918.—Discusses commercial barks derived from *Viburnum Opulus* Lin., *V. prunifolium* Lin., and *V. Lentago* Lin. and the substitution of the bark of *Acer spicatum* Lam. for that of the first named above. Black Haw (*V. prunifolium* or *V. Lentago*) was generally true to name but Cramp Bark was generally *Acer spicatum*. The barks of both the stems and roots of all four species are illustrated in cross sections and the distinguishing characters of each pointed out. The Viburnum tannins give a green color with iron salts whereas a blue color is developed by the Maple tannins.—O. A. Farwell.

PHYSIOLOGY

B. M. DUGGAR, Editor

[Unsigned abstracts are by the editor.]

676. FISCHER, M. H. The colloidal-chemical theory of water absorption by protoplasm. A fifth response to some criticisms. Jour. Amer. Chem. Soc. 40: 862-867. 1918.

677. HENDERSON, L. J. On the swelling of protein colloids. A reply. Jour. Amer. Chem. Soc. 40: 867-868. 1918.

678. HENDERSON, L. J., AND E. J. COHN. On the swelling of protein colloids. A reply to Professor Martin H. Fischer. Jour. Amer. Chem. Soc. 40: 857-861. 1918.

679. LLOYD, F. E. The colloidal properties of protoplasm: Imbibition in relation to growth. Trans. Roy. Soc. Canada III, 11: 133-139. 1 fig. 1917.—In the growth of pollen tubes of *Phaseolus odoratus* imbibition pressure is a dominant factor. This is shown by the fact that growth rates vary inversely with the concentration of the medium (up to 50 per cent of cane-sugar). The pollen bursts in water and after brief initial growth in concentration up to ca. 20 per cent. In this maximum rates without bursting occur. By combining acids and alkalis in connections from $n/400$ to $n/25,600$ with 20 per cent cane sugar, a maximum growth rate was found to occur at ca. $n/3,200$ of the acid (acetic) and of the alkali (sodium hydrate) component, the rates being lower for both higher and lower concentrations. In higher concentrations coagulation occurs; in lower, excessive imbibition and bursting.

The swelling rates of gelatin were also studied. It was substantiated that there is a concentration of acid which induces maximum rate (above $n/640$) and it was found that the same is true for alkalis. It was further found that the maximum rate occurs first at high concentrations, but as time elapses, at successively lower concentrations. For inorganic acids the maximum rate occurs at lower concentrations than for organic acids. There is also a concentration (of acid and of alkali) at which a minimum swelling rate less than that for water occurs.—It is argued that an analogy obtains between the living protoplasm and gelatin, but the wide differences of effective concentrations are to be noted. [See Bot. Absts. 1, Entry 680.]—F. E. Lloyd.

680. LLOYD, F. E. The effect of acids and alkalis on the growth of the protoplasm in pollen tubes. Mem. Torr. Bot. Club 17: 84-89. 1918.—Contents of this paper are included in abstract under preceding Entry, 679.

681. MACDOUGAL, D. T. Annual report of the director of the Department of Botanical Research. Carnegie Inst. Washington, Year Book 16: 59-98. 1918.—Brief reports on the projects (mostly physiological) under investigation by the staff of the Desert Botanical Laboratory, Tucson, Arizona.

682. CLOWES, G. H. A. On the action exerted by antagonistic electrolytes on permeability of emulsion membranes. Proc. Soc. Exp. Biol. and Med. 15: 108-111. 1918.—A preliminary note indicating that artificial membranes of filter paper saturated with an emulsion of oil and soap exhibit variations in electrical conductivity and permeability under the influence of antagonistic agents corresponding to those which have been found for living plant tissues.

683. CLOWES, G. H. A. On the electrical resistance and permeability of tumor tissues. Proc. Soc. Exp. Biol. and Med. 15: 107-108. 1918.—Preliminary determinations indicate that cancer tissues and tissues derived from plant galls are uniformly more permeable than normal tissues. It would appear that permeability bears some relation to proliferation and speed of growth.

684. HARRIS, J. A. On the osmotic concentration of the tissue fluids of desert Lorantheae. Mem. Torr. Bot. Club 17: 307-315. 1918.—Continuing work on the general subject of the osmotic pressure of parasitic *Loranthaceae*, it is developed that in three desert forms concentration of the tissue fluids is approximately twice as great as that of species in the montane rain-forest of the Jamaican Blue Mountains. [See Bot. Absts. 1, Entry 828.]

685. STILES, WALTER, AND INGVAR JØRGENSEN. Quantitative measurement of permeability. Bot. Gaz. 65: 526-533. 1918.—A polemical paper and critique. After certain practical suggestions on the complexity of the system involved in cell permeability phenomena, the authors take issue with Osterhout as to the validity of his criticism of their work. They further discuss the published work of Osterhout regarding the "permeability of the protoplasm" under three heads; namely: "(1) which part of the system it is, the permeability of which he intends to measure; (2) how far the values he obtains for the electrical conductivity of plant tissues are true measures of this conductivity; and (3) whether it is legitimate to assume that the electrical conductivity is a measure of the permeability." They conclude (1) that to have his results accepted he must define permeability in a quantitative sense, (2) prove that his method gives values for the conductivity of the tissue employed, and (3) furnish evidence that electrical conductivity of tissue is a measure of permeability as he employs the term.

686. THODAY, D. On turgescence and the absorption of water by the cells of plants. New Phytol. 17: 108-113. 1918.—The writer gives a brief "elementary exposition of the conditions which govern the equilibrium of a cell with a watery solution and with other cells" and illustrates the consequences by applying them in definite cases.—Zeller (St. Louis).

687. TRUE, R. H. Notes on osmotic experiments with marine algae. Bot. Gaz. 65: 71-82. 1918.—In an endeavor to ascertain the osmotic value of the sea water at Woods Hole, Massachusetts, the author first studied certain fresh water algae the cells of which were found to have an osmotic equivalent of from 6.7 to 7.2 atmospheres as measured by cane sugar and sodium chloride respectively. The pressure found corresponds to a 30 per cent sea water solution. The plasmolytic data indicate that the sea water has an osmotic value of 22.6 atmospheres, whereas determined cryoscopically by Garrey it was 23.8 atmospheres. The osmotic surplus of *Cladophora*, *Enteromorpha*, and *Chaetomorpha* was 6.6 and 11.7 atmospheres when determined respectively by cane sugar and sodium chloride—the great difference being explainable on the basis of the greater penetrability of the latter.

688. DUGGAR, B. M., AND W. W. BONNS. The effect of Bordeaux mixture on the rate of transpiration. Ann. Missouri Bot. Gard. 5: 153-176. Pl. 10. 1918.—In continuation of

earlier work extensive experiments are conducted on potted tomatoes, potatoes, marguerites, tobacco, and umbrella plants, and also on excised leaves of the castor bean. All tests were made on a table, or carrier, arranged to give general horizontal rotation as well as rotation of the individual pot carriers. Under the conditions maintained in the greenhouse it was found that a film of Bordeaux mixture, and certain other analogous materials, effect an increase in the rate of transpiration of the usual potted mesophytic plants, which is mainly, if not entirely, confined to the night intervals. The excised leaves exhibit a similar transpiration increase as a result of the presence of the spray. On the other hand, potted *Cyperus esculentus* shows no augmentation of transpiration rate. The facts are interpreted as suggesting that under night conditions there may be assumed to exist in such mesophytic types a state of guttation, or incipient guttation and that accordingly a "bibulous" surface film would facilitate the molar movement of water and possibly greatly increase the actively evaporating surface. It is assumed that a condition approaching guttation may not be realized in *Cyperus*.

689. ALLISON, F. E. Some availability studies with ammonium phosphate and its chemical and biological effects upon the soil. *Soil Science* 5: 1-80. *Fig. 1-10*. 1918.—Since the development of a method satisfactory for the manufacture of ammonium phosphate it has become important to establish the conditions under which this nutrient may be economically applied for the growth of various crops. This paper includes the results of an extensive laboratory and greenhouse study employing the usual tumbler, fresh-soil method. In general it is found that ammonium phosphate is a fertilizer of the same general type as those usually furnishing nitrogen and phosphate and the value is equivalent to the amount of nitrogen as ammonium sulphate and of phosphorus as acid phosphate. The nitrification experiments show an increase in nitrate accumulation in garden and meadow soil followed by a decline indicating nitrate assimilation by the micro-organisms. Calcium carbonate promoted nitrification, but calcium oxide did not. In this case the ammonium phosphate gave results similar to ammonium sulphate.—With respect to the effect of the ammonium phosphate upon germination the results are comparable with those of other fertilizers, an application of 150 pounds or more being the limit per acre in the experiments with corn.

690. AYERS, S. H., AND P. RUPP. Simultaneous acid and alkaline bacterial fermentations from dextrose and the salts of the organic acids respectively. *Abst. Bact.* 2: 11. 1918.

691. BUCHANAN, R. E. Determination of the fermentation capacity of a single bacterial cell. *Abst. Bact.* 2: 11. 1918.

692. BUNKER, J. W. M. Further studies on the effect of H-ion concentration upon the diphtheria bacillus. *Abst. Bact.* 2: 10. 1918.

693. CLARK, W. M. Remarks upon the use of indicators. *Abst. Bact.* 2: 10. 1918.

694. COHEN, B., AND W. M. CLARK. The influence of the P_H of media upon the reproduction of some common bacteria. *Abst. Bact.* 2: 10. 1918.

695. CORSON, G. E., AND A. L. BAKKE. The use of iron in nutrient solutions for plants. *Proc. Iowa Acad. Sci.* 24: 477-482. *Fig. 95-98*. 1917.

696. DORYLAND, C. T. J. The possibility of obtaining nitrogenous fertilizers by utilizing waste materials for the fixation of nitrogen by nitrogen-fixing bacteria. *Abst. Bact.* 2: 2. 1918.

697. FRED, E. B. Studies of the reactions of media for higher plants and bacteria. *Abst. Bact.* 2: 10. 1918.

698. GIBBS, W. M., AND E. B. FRED. Isolation and study of the nitrifying organisms. *Abst. Bact.* 2: 1. 1918.

699. GILLESPIE, L. J. The growth of the potato-scab microorganisms at various hydrogen concentrations as related to the occurrence of potato scab. [See *Bot. Absts.* 1, Entry 309.] *Abst. Bact.* 2: 1. 1918.

700. KOCH, G. P. The potassium requirements of *Bacillus subtilis*. *Abst. Bact.* 2: 2. 1918.

701. KOCH, G. P. Potassium requirements of bacteria. *Soil Science* 5: 219-224. 1918.—In the work here reported the method is the same as in a previous paper and the same organism, *Bacillus subtilis*, was employed. The results represent therefore the influence of potassium sulphate as shown by the formation of ammonia from dialyzed peptone. It was shown in the first place that the absence of potassium exerts a strong inhibition on ammonia formation and in the second place that the concentration may be varied from .24 mg. to 1.25 without seriously affecting the activity of the organism.

702. KOSER, S. A. Studies upon bacterial nutrition. The utilization of nitrogenous compounds of definite chemical composition. *Abst. Bact.* 2: 12. 1918.

703. LEFEVRE, E. A preliminary study of salt organisms. *Abst. Bact.* 2: 7. 1918.

704. LIPMAN, C. B. The significance of the sulfur in sulfate of ammonia [applied to certain soils. *Soil Science* 5: 81-86. 1918.

705. LOEB, J. The origin of the conception of physiologically balanced salt solutions. *Jour. Biol. Chem.* 34: 503-504. 1918.

706. MAQUENNE, L., AND E. DEMOUSSY. Influence des sels metalliques sur la germination en presence de calcium. *Compt. rend. Acad. Sci. Paris* 166: 89-92. 1918.—Continuing in the direction of work previously reported the authors have tested three concentrations of a variety of salts, employing, in general, dilutions somewhat below those which may be considered toxic to the plant for each salt used alone. He used NaCl, KCl, $(\text{NH}_4)_2\text{SO}_4$, SrCl_2 , BaCl_2 , MgSO_4 , ZnSO_4 , MnCl_2 , PbCl_2 , and CuSO_4 and in duplicate tests the same concentrations of these salts together with 0.5 mgm. CaSO_4 or 0.4 mgm. CaCl_2 in a vessel containing 40 grams of sand and 10 cc. of the salt tested. All the salts except BaCl_2 and lower concentrations of PbCl_2 lessened the benefits derived from controls in which calcium salts alone were employed.

707. NORTHRUP, Z. Anaerobic culture volumeter: a simple apparatus for the quantitative and qualitative determination of gas produced by microorganisms. *Abst. Bact.* 2: 13. 1918.

708. OSTERHOUT, W. J. V. The basis of measurement of antagonism. *Jour. Biol. Chem.* 34: 363-368. *Fig. 1-4.* 1918.—Along the line of earlier work the author discusses briefly the importance of the additive effect in the measure of antagonism. He endeavors to show by curves and discussion that without knowledge of the additive effect the observed effect may not indicate antagonism except under special conditions, thus giving weight to the necessity of determining this additive effect—defined by him as that effect which would be found if no antagonism existed.

709. PRUCHA, M. J., H. M. WEETER AND W. H. CHAMBERS. Hypochlorites as a disinfectant for rubber. *Abst. Bact.* 2: 19. 1918.

710. BROWN, C. W., AND J. F. MORGAN. An interpretation of the cycles of carbon, nitrogen and sulfur. *Abst. Bact.* 2: 2. 1918.

711. OSTERHOUT, W. J. V. A demonstration of photosynthesis. *Amer. Jour. Bot.* 5: 105-111. *Fig.* 1-2. 1918.—A piece of relatively simple apparatus is described whereby it is possible to demonstrate and to measure photosynthesis. The apparatus permits the removal of samples of the gas so that the progress of the phenomenon may be followed as also the effects of conditions upon it. It is applicable to certain types of respiration study.

712. OSTERHOUT, W. J. V., AND A. R. C. HAAS. A simple method of measuring photosynthesis. *Science* 47: 420-422. 1918.—It was ascertained that the amount of photosynthesis of aquatic plants, especially algae could be determined by the change in PH value. Marine and fresh water plants caused the water to become more alkaline, the former in natural sea water and the latter in solutions containing bicarbonates. The amount of photosynthesis is approximately a linear function of the change in PH value. Phenolphthalein was used as an indicator.

713. MURRAY, T. J. The effect of different plant tissues on the fixation of atmospheric nitrogen. *Virginia Agric. Exp. Sta. Tech. Bull.* 15: 93-102. 1917. [Received, 1918.]—To determine the influence of plant material on the nitrogen fixation of *Azotobacter* the author added 1 per cent of tissue from various grasses, legumes, and a few other plants—21 in all—to Hagerstown silt loam and to sand cultures incubating at 28°C. Nitrogen determinations were made after various intervals with the result that in the case of the Hagerstown silt loam a stimulating action from the addition of all of the organic materials was found with the exception of three, whereas in the sand cultures only twelve produced a slight stimulation of nitrogen fixation.

714. ROBBINS, W. J. Direct assimilation of organic carbon by *Ceratodon purpureus*. *Bot. Gaz.* 65: 543-551. *Fig.* 1-5. 1918.—This moss was grown 2.5 months in pure cultures in flasks of 125 cc. capacity. The culture solution consisted of 50 cc. of a mineral nutrient solution with the addition (except in certain controls) of a sufficient amount of the organic compound to make 0.1 mol. Cultures in triplicate were placed in the light and in darkness. The greatest amount of growth in the dark was made with levulose as a source of carbon; apparently considerably less with glucose, cane sugar, and maltose; very little with galactose and lactose; and none with mannite, glycerol, and starch. In all in which growth occurred in the dark starch was also formed. In the light there was growth in all cultures, "showing that none [of the compounds mentioned] was toxic to the moss." Quantitative comparative data are given showing that with levulose the amount of growth was two to seven times greater than with glucose. Abundant protonema were produced in the dark but light is required for the production of the moss plant.

715. BIDWELL, G. L. A physical and chemical study of the kafir kernel. *U. S. Dept. Agric. Bull.* 634: 1-6. *Fig.* 1. 1918.

716. FISKE, C. H. The inhibition of foaming. *Jour. Biol. Chem.* 35: 411-413. 1918.—A general discussion of principles involved in the prevention of foaming where air is necessarily forced through solutions such as soaps and proteins. An efficient inhibitor has been found in isoamyl isovalerate. Methods of preparing this compound are given.

717. GIVENS, M. H. The composition of dried vegetables with special reference to their nitrogen and calcium content. *Soc. Exp. Biol. and Med.* 15: 101. 1918.

718. HALL, H. M., AND T. H. GOODSPEED. An emergency supply of rubber. *Science* 47: 452-454. 1918.—Brief indications showing the content of rubber in species of *Chrysothamnus*, *Ericameria*, and *Stenotus*.

719. KOESSLER, J. H. Studies on pollen and pollen disease. I. The chemical composition of rag-weed pollen. Jour. Biol. Chem. 35: 415-424. 1918.—This is an endeavor to work toward a determination of that chemical fraction of the pollen substance inducing hay fever, and the present paper involves a study of chemical composition with particular attention to nitrogen distribution. Two species of *Ambrosia* were employed. A feature of interest in the analyses is the relatively high content of histidin in protein hydrolysis, especially as compared with the amount of arginin. [See Bot. Absts. 1, Entry 1408.]

720. MACLEAN, H. Lecithin and allied substances: the lipins. Monograph on biochemistry. 206 p. Longmans, Green & Co., London. 1918.—The present volume supplements the monograph by Leathes on fats, and is restricted to the phosphatides and the cerebrosides, which are here designated lipins with the understanding that this term is employed for "substances of a fat-like nature yielding on hydrolysis fatty acids or derivatives of fatty acids and containing in their molecule either nitrogen, or nitrogen and phosphorus."

The author gives a relatively simple classification, including under the phosphatides two representatives of mono-amino-mono, one of di-amino-mono, and one of mono-amino-di phosphatides. Of the cerebrosides phrenosin and kerosin alone are recognized. He regards other forms occurring in the literature as insufficiently established and not definitely isolated. A full account is given of the occurrence, extraction, isolation, and purification of both groups. He regards protagon as a mixture of the two groups referred to and devotes considerable attention to a discussion of insufficiently characterized lipin-like substances. The plant phosphatides are shown to offer one opportunity for future research. The difficulties in the study of these bodies appear to be greater than in the case of corresponding substances in animals. In general, however, the conclusion is derived that there is no essential difference between the two groups. The presence of sugar in the analyses seems to indicate that cerebrosides also occur in plant tissues, but very few attempts have been made to isolate and characterize these bodies. The author concludes that the biological significance of lipins is unknown, and that the views thus far advanced as to their functions are merely suggestive.

721. PAMMEL, L. H., AND A. W. DOX. The protein content and microchemical tests of the seeds of some common Iowa weeds. Proc. Iowa Acad. Sci. 24: 527-532. 1917. [Received, 1918.]—A quantitative study was made of the protein content of about 60 weed seed, likewise microchemical tests to determine qualitatively the amount of starch, protein and fat in a much larger number.

722. PLIMMER, R. H. A. The chemical constitution of the proteins. Part 1. Analysis. 3rd ed. XII + 174 p. Longmans, Green & Co., London, 1917.—A new edition of this monograph is justified by the importance of the contributions which have been made during the past five years in relation to methods of protein hydrolysis and the quantitative estimation of the cleavage products. Extensive data are given showing the nature of various proteins as regards the amino acid constituents and their nitrogen partition. There is eliminated from Part 1 in this edition the description of the amino acids, which is reserved for separate treatment.

723. RICHARDS, H. M. Determination of acidity in plant tissues. Mem. Torr. Bot. Club 17: 241-245. 1918.—A brief discussion of methods of obtaining samples of plant juices as nearly that of the normal tissues as possible for titration purposes.

724. SANDO, C. E., AND H. H. BARTLETT. The flavones of *Rhus*. Amer. Jour. Bot. 5: 112-119. 1918. Flavone pigments were isolated from *Rhus typhina*, *R. glabra*, and *R. copallina*. Analyses and careful study of the pigments from wood and from leaves enable the authors to verify Perkin's conclusion to the effect that the same flavone is not likely to be found in wood and leaves of the same species. It seems to be established that fisetin is the wood flavone, while myricetin is distinctively the leaf flavone. No relationship between the two flavones, nor between these and the anthocyanins of leaf and berry have been established.

725. TANNER, F. W. Studies on the bacterial metabolism of sulfur. Jour. Amer. Chem. Soc. 40: 663-669. 1918.—This is a second paper on the general subject stated and is devoted to a study of the relations of thirty species or strains of yeast-like fungi assembled from various sources. The paper is concerned chiefly with the formation of hydrogen-sulphide from the following sulfur-compounds or sources: peptone; cystine; sodium taurocholate, phenol sulfonate, sulfate, sulfite, and thiosulfate; potassium thiocyanate; thiourea; and free sulfur. Cystine is reduced by all of the organisms studied except one, sodium sulfite by all except six. The other compounds noted are reduced by a considerable number of organisms except that in the cases of sodium phenolsulfonate, and taurocholate, one and two organisms respectively are able to effect the reduction. Only eight organisms failed to produce hydrogen sulfide from free sulfur. The test for hydrogen sulfide was made by means of a strip of filter paper treated with saturated lead acetate and a small amount of glycerol, suspended in the culture over the substrate.
726. VIEHÖEVER, A., L. H. CHERNOFF AND C. O. JOHNS. Chemistry of the cotton plant, with special reference to upland cotton. Jour. Agric. Res. 13: 353-366. Fig. 1. 1918.—This investigation was undertaken in order to isolate the weevil at the same time to determine the products of hydrolysis and to establish whether or not the upland cotton contained the substances formerly isolated from Indian and Egyptian types. It is shown that both quercitrin and isoquercitrin are present in upland cotton. Gossypitrin and gossypetin were not found. The investigation revealed the presence of an ethereal oil in *G. hirsutum* dissimilar to that found in the root of *G. herbaceum*.
727. ZOLLER, H. F. Some constituents of the American grapefruit (*Citrus decumana*). Jour. Ind. and Eng. Chem. 10: 363-374. Fig. 1-2. 1918.—After a general discussion of the introduction of the grapefruit and its heralded therapeutic value the author submits analyses of the peel showing the amounts of essential oils (limonene, citral, pinene, and alcohols), the glucoside naringin, and pectin. Citric acid, naringin and pectin are found to decrease with long storage, while reducing sugars and sucrose show an increase. Culls are considered an available source of industrial alcohol.
728. ASAI, TOICHI. Physiologische Untersuchungen über eine neue, in der Gerbrührge gedeihende Kahlhefe. Jour. Coll. Sci. Imp. Univ. Tokyo 39: 1-42. Pl. 1-2. 1918.—The author describes a new yeast, *Mycoderma tannica*, common in the tanning industry. On gypsum blocks it forms no spores at 30°C., but produces resting cells filled with fat and glycogen. The organism grows well on ethyl alcohol as a source of carbon and particularly well on the hexoses but very indifferently upon maltose, lactose, and many polysaccharids. Alcoholic fermentation is extremely weak, and this is somewhat augmented by the presence of tannin up to three per cent. Tannin is fermented, but the curve of the production of tannase does not correspond with the curve of growth. Alcohol and glucose are converted in part to oxalic and acetic acid. As a source of nitrogen amino acids such as asparagin and tyrosin are most usable, ammonium salts of organic and inorganic acids serve fairly well, while nitrites and nitrates inhibit development.
729. BIGELOW, W. D. Problems of canning operations. Amer. Jour. Public Health 8: 212-216. 1918.
730. HORN, J. S. The importance of pure culture work in industrial processes. Abst. Bact. 2: 7. 1918.
731. NELSON, V. E., AND A. J. BECK. By-products of the fermentation of cabbage. Jour. Amer. Chem. Soc. 40: 1001-1005. 1918.—A complete description of methods of estimation is reserved for future publication. Cans of fermented cabbage were bought on the market. The material was finally comminuted, made slightly acid to congo red with sulphuric acid, and subjected to steam distillation until two liters were obtained. The volatile acid was

determined by titration with barium hydroxide and the alcohols and esters redistilled from two-thirds of the original distillate until 50 cc. were obtained. This last "flavor" solution was saponified with 10 cc. of 20 per cent potassium hydroxide and the alcohols distilled off, the acids of esters being now obtained as potassium salts. After decomposition with dilute sulphuric acid and distillation these were titrated with barium hydroxide. The free acids and those obtained from ester saponification and alcohol oxidation were subjected to the Duclaux method of analysis. The alcohols had previously been concentrated by distillation by means of potassium dichromate in sulphuric acid. Acetic and propionic acids form the main volatile portion, although formic acid was twice isolated, volatile acidity representing a considerable portion of the total. It was concluded that the fixed acidity was due to inactive lactic acid. Alcohols of the same extent as volatile acids were found and these consist of ethyl and propyl alcohol. Esters contribute to the flavor and aroma.

732. YOUNG, V. H. Some factors affecting inulase formation in *Aspergillus niger*. Plant World 21: 114-133. 1918.—Upon ascertaining that cultures of *Aspergillus niger* grew well on inulin and came to fruiting somewhat earlier than those on soluble sugars the author proceeded to determine some relations of this fungus to inulase production. The enzyme was found to be secreted under all conditions studied, but in greatest amount at the time of sporulation. The presence of inulin in the culture medium stimulates inulase production, yet the enzyme is produced in the presence of other carbohydrates, those more closely related to inulin being apparently more efficient in stimulation. The quantity of inulin in the medium is a factor affecting the amount of the enzyme secreted, yet there is no close proportionate relation. The production of the enzyme is not a starvation phenomenon.

733. OSTERHOUT, W. J. V. The determination of buffer effects in measuring respiration. Jour. Biol. Chem. 35: 237-240. Fig. 1. 1918.—In connection with the indicator method of measuring respiration it is often necessary to measure the buffer of reagents added. The author has constructed an apparatus consisting of a capillary tube connected by rubber tubing to two Y-tubes, one arm of which is connected in turn with thistle-tubes, the other arms acting as inlet and outlet for gases, thus permitting the addition of measured quantities of CO₂ to the liquid whose volume and Ph is known or which may be determined after the addition of the CO₂.

734. BIOLETTI, F. T., AND F. C. H. FLOSSFEDER. Topping and pinching vines. California Agric. Exp. Sta. Bull. 296: 369-384. Fig. 1-3. 1918.—The experiments reported in this publication point clearly to an ultimate injury to the vigor of certain types of grapes grown under the conditions mentioned when the practice is continued year after year. It is pointed out that under conditions of excessive vigor of growth the control of development by pinching and topping may not prove so injurious. The topping practised consisted in cutting off one or more feet of growing shoot during summer or autumn while the pinching process involves removal with thumb and fore finger of the extreme tips of growing shoots in late spring and early summer. The processes had been supposed to be decidedly advantageous. [See Bot. Absts. 1, Entry 1655.]

735. WOLF, F. A. Intumescences, with a note on mechanical injury as a cause of their development. Jour. Agric. Res. 13: 253-260. Pl. 18-19, fig. 1. 1918.—After a brief review of the reported causes of intumescences on plants the author is inclined to accept the view of Fischer based on colloid water relations in an acid medium and he presents observations and experiments to show that wind-blown sand may induce intumescence of cabbage leaves. The over growth of cells is considered to be related to absorption and probably due to intensified hydration of the cell colloids in the presence of increased acid content as a result of oxidation. [See Bot. Absts. 1, Entry 648.]

736. LOEB, J. Chemical basis of correlation. I. Production of equal masses of shoots by equal masses of sister leaves in *Bryophyllum calycinum*. Bot. Gaz. 65: 150-174. Fig. 1-18.

1918.—Pursuing further his studies in regeneration and correlation with *Bryophyllum* the author has sought to determine by many and varied experiments if equal masses of sister leaves in the same time and under similar conditions produce approximately equal masses of shoots. Such a law of mass relations was established. It was found, furthermore, that these mass relations hold although the number of shoots may differ. Leaves which had been cut into parts or reduced in mass yielded a proportionate decrease in the mass of shoots. It is believed that the absorption of water is necessary to initiate growth and therefore when leaves are suspended in moist air those grow out first which by location or other accidental occurrence obtain first the adequate water supply. [See Bot. Absts. 1, Entry 68.]

737. SAITO, K. Die Parthenosporenbildung bei *Zygosaccharomyces* und ihre Abhängigkeit von der Temperatur. Bot. Mag. 32: 26-27. 1918.—Parthenospores in species of *Zygosaccharomyces* have been known and the author attempts to determine the conditions under which such spores are produced. It is shown that by constant incubation at temperatures of 33-35°C. only parthenospores are produced. The behaviour of these organisms in respect to temperature is therefore analogous to that of certain Thallophytes and higher plants.

738. HAYDEN, J. L. R., AND C. P. STEINMETZ. Effect of artificial light on the growth and ripening of plants. Gen. Elec. Rev. 21: 232. 1918.—The growth and ripening of string beans under Mazda electric lamps was compared with the same under natural conditions. The fruit ripened in a little more than half the time required under daylight alone.—Zeller (St. Louis).

739. TODA, YASUMOCHI. Physiological studies on *Schistostega osmundacea* (Dicks.) Mohr. Jour. Coll. Sci. Imp. Univ. Tokyo 40 (Art. 5): 1-30. Pl. 1-2. 1918.—This luminous moss occurs in small caves where the light intensity is considerably reduced and the optimum intensity is found to be 0.02-0.002 (Bunsen's unit), the protonema continuing to thrive, however, at 0.0008. The plant does not grow in places where the intensity of light is over 1. Related to assimilation in a feeble light seems to be the spherical cell of the protonema. Next to white light the moss thrives best in the blue and violet region of the spectrum. For shoot development the optimum temperature is 16 to 25°C. and the optimum humidity 90 to 100. The plant is stimulated by a relatively high content of calcium salts in the medium and Marchal's solution is a favorable cultural medium.

740. BUCHANAN, R. E., G. E. THOMPSON, P. F. ORR and E. M. BRUETT. Notes on conditions which influence thermal death points. Abst. Bact. 2: 5. 1918.

741. BUSENELL, L. D. The influence of cold shock in the sterilization of canned foods. Jour. Ind. and Eng. Chem. 10: 432-436. 1918.—A report of numerous experiments on the value of the "blanching" process and of small amounts of sodium chloride, acetic acid, and other factors in reducing the time necessary for the proper sterilization or "processing" of canned foods. In general the results show that cold shock or rapid cooling is of practically no value, and similarly a small amount of salt is ineffective, while a small amount of acetic acid promotes a more rapid sterilization.

742. LEVINE, M. The physiological properties of two species of poisonous mushrooms. Mem. Torr. Bot. Club 17: 176-201. Pl. 1-2. 1918.—In this study no attempt was made to isolate the toxic constituents of the fungi employed, but attention was confined wholly to the general physiological effects of infusions of *Panaeolus venenosus*, *P. retirugis* and, by comparison, *Agaricus campestris*. Such experiments have become important as a result of relatively recent cases of poisoning arising from the use of species of *Panaeolus* growing on mushroom beds. The experiments include the effect (1) of infusions injected into or fed to guinea pigs and rabbits, (2) on the heart beat and blood pressure of a cat, (3) on the gastrocnemius of the frog and (4) on the sciatic and vagus nerves of the frog. [See Bot. Absts. 1, Entry 421.]

743. NOYES, H. A., AND L. YODER. Effect of carbon dioxide gas on bacterial numbers, ammonification, and nitrification. *Abst. Bact.* 2: 3. 1918.

744. STEINBERG, R. A. A study of some factors influencing the stimulative action of zinc sulphate on the growth of *Aspergillus niger*. 1. The effect of the presence of zinc in the cultural flasks. *Mem. Torr. Bot. Club* 17: 287-293. 1918.—Special attention is drawn to the composition of the cultural flask itself and data are produced showing that *Aspergillus niger* attains a greater growth in Jena glass than in Kavalier Bohemian or in Pyrex. On adding small quantities (2.5 mgm. zinc per cubic centimeter) of zinc sulphate to cultures in the two wares last mentioned a similar increased growth amount is obtained. It is shown to be extremely probable that the increased growth in Jena flasks is due to the presence of zinc in this glass—the occurrence of zinc in Jena glassware being established by the work of others.

745. HARPER, R. A. The evolution of cell types and contact and pressure responses in *Pediastrum*. *Mem. Torr. Bot. Club* 17: 210-240. *Fig. 1-27*. 1918.

746. MORITA, K. Influences de la pollinisation et d'autres actions extérieures sur la fleur des *Cymbidium virens*, Lindl. *Bot. Mag.* 32: 39-52. *Fig. 1-10*. 1918.—A study was made of the influence of (1) pollination on the period of flowering and appearance of the flower, (2) of dead pollen and pollen extract, (3) such mechanical stimuli as grains of sand and injury, (4) of saprophytic fungi such as *Aspergillus*, *Mucor*, and *Penicillium*, (5) of foreign pollen, (6) chemical agents. It is shown that pollination prolongs the period of flowering and closes the stigma as well as producing growth influences in the gynoeceum. Dead pollen and aqueous pollen extracts affect only the closing of the stigma. No effect is produced by mechanical injury. The pollen of certain other orchids affects markedly the closing of the stigma, while that of many species has no action whatever. The effects of certain organic acids and sugars remain more or less doubtful.

747. NORTON, J. B. S., AND C. E. LEATHERS. Conditions detrimental to seed production. Maryland Agric. Exp. Sta. Bull. 216: 175-226. 1918.—Brief notes are given on the factors influencing the setting of fruit and the productions of seed in the chief crop plants. An extensive bibliography is included. [See Bot. Absts. 1, Entry 628.]

748. WINSLOW, C.-E. A., AND B. COHEN. The distribution and relative viability of *B. coli* and *B. aerogenes* in water. *Abst. Bact.* 2: 4. 1918.

749. RAMSEY, G. B. Influence of moisture and temperature upon infection by *Spongospora subterranea*. *Phytopath.* 8: 29-31. 1918.—A greenhouse experiment showing that infection by this fungus is practically restricted to cool moist conditions. [See Bot. Absts. 1, Entry 135.]

750. PAINE, S. O., AND L. M. SAUNDERS. Note on a peculiarity exhibited by the testa of wrinkled peas. *Ann. Bot.* 32: 174. 1918.

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

GENERAL

751. BURNHAM, STEWART H. The flora of Indian Ladder and vicinity: together with descriptive notes on the scenery. *Torreya* 18: 101-116, 127-149. *Fig. 1-9*. 1918.—Representatives from all groups of non-vascular cryptogams are included in the present paper. *Lecanora cerina siderites* (*Placodium cerinum siderites* Tuck.) appears as a new combination.

BRYOPHYTES

752. BROTHERUS, V. F. Contributions to the bryological flora of the Philippines. V. Philip. Jour. Sci. (Bot.) 13: 201-222. 1918.—One hundred seventy-two species are enumerated, 18 of which are proposed as new. New species of the following genera are described: *Barbella*, 1; *Dicranoloma*, 2; *Ectropothecium*, 1; *Eriopus*, 1; *Fissidens*, 1; *Garovaglia*, 2; *Gymnostomiella*, 1; *Leskeodon*, 1; *Meiothecium*, 1; *Pseudopohlia*, 1; *Rhaphidostegium*, 1; *Sematophyllum*, 1; *Taxithelium*, 3; and *Trichosteleum*, 1.—*Wm. H. Brown.*

753. COKER, DOROTHY. Revision of the North American species of *Eucalypta*. Bull. Torr. Bot. Club 45: 433-449. Pl. 13-14. 1918.—Miss Coker has studied intensively the North American species of the genus *Eucalypta* Schreb., reducing the 17 species in Engler & Prantl to 8, except as *E. lacera* Ren. & Card. is left doubtful, no material of it being available for study. Synonymy, distribution and figures of each accepted species are given and some of the variant forms are distinguished as varieties. All species accepted are boreal and were originally described from Europe.—*A. Le Roy Andrews.*

754. DIXON, H. N. The mosses collected by the Smithsonian African Expedition, 1909-1910. Smithsonian Misc. Coll. 69²: 1-28. Pl. 1-2. 1918.—Forty-eight species are listed, collected by Dr. Edgar A. Mearns in British East Africa, mostly on Mt. Kenia. They include new species in *Sphagnum*, *Hymenostylium*, *Leptodontiopsis*, *Rhacomitrium*, *Bryum*, *Philonotis*, *Breutelia*, *Polytrichum*, *Hygroamblystegium*, *Calliergon*, *Isopterygium*, *Rhynchostegiella*. The occurrence of boreal species on the higher mountains of equatorial Africa is discussed.—*A. Le Roy Andrews.*

755. DIXON, H. N. Uganda mosses collected by R. Dümmer and others. Smithsonian Misc. Coll. 69³: 1-10. Pl. 1. 1918.—Twenty-seven species of mosses are enumerated, of which 8 are figured and described as new. The latter are placed in the genera *Brachymenium*, *Pilotrichella*, *Cyathophorum* (a genus not hitherto known from Africa), *Rhacopilum* (2), *Lindbergia*, *Thuidium*, *Ectropothecium*.—*A. Le Roy Andrews.*

756. FRYE, T. C. Illustrated key to the western Sphagnaceae. Bryologist 21: 37-48. Pl. 17-23. 1918.—The area covered is from the Rocky Mountains to the Pacific Ocean and from the northern boundary of Mexico to the Arctic Ocean. Twenty-four species and two varieties are included, with key for identification and illustrations of all but one species. The figures bring out the points of diagnostic value, especially the outline and relative size of the stem-leaf, the section of the branch-leaf and the characters of the individual hyaline cell of the branch-leaf.—*A. Le Roy Andrews.*

757. LUISIER, A. Les mousses de Madère. Broteria 16: 29-48, 49-83. 1 pl. 1918.—A continuation of an historical introduction to Madeiran bryology published in 1917. Special attention is given to the relationship between the flora of Madeira and that of the other Atlantic Islands, with careful examination of all previously published records. The present list includes an extensively annotated list of species from *Sphagnum* to *Barbula* with localities and critical notes. One plate illustrates certain species discussed. One new form in *Campylopus*, and one new combination in the same genus, appear.—*E. B. Chamberlain.*

758. POTIER DE LA VARDE, R. *Ptychomitrium subcrispatum* Thér. et P. de la V. (spec. nov. natalensis). Rev. Gén. Bot. 30: 65-69. Pl. 17. 1918.—This new species from Natal, South Africa, is described and figured in detailed comparison with *P. crispatum* (H. & Grev.) Schimp.—*A. Le Roy Andrews.*

759. RÖLL, J. Vierter Beitrag zur Moosflora des Erzgebirges. Hedwigia 60: 12-49. 1918.—The article consists mostly of lists of species and forms of *Sphagnum*, together with some notes upon other characteristic mosses.—*A. Le Roy Andrews.*

760. THÉRIOT, I. À propos du *Braunia diaphana* (C. M.) Jaeg. et du *Leucodon sekistos* Welw. et Duby. Bull. Soc. Bot. Genève 9: 135-136. 1917.—*Braunia diaphana* belongs to the section Eubraunia, being a close relative of *B. Schimperiana*. *Leucodon sekistos* is completely synonymous with *Braunia diaphana*.—E. B. Chamberlain.

761. WILLIAMS, R. S. Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906. Torrey 18: 210-211. 1918.—Nine species of lichens and six of mosses are listed from the north shore of Grant Land. [See Bot. Absts. 1, Entry 762.]

LICHENS

762. WILLIAMS, R. S. Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906. Torrey 18: 210-211. 1918. [See Bot. Absts. 1, 761.]

ALGAE

763. CROW, W. BERNARD. The classification of some colonial Chlamydomonads. New Phytol. 17: 151-159. Fig. 1-2. 1918.—The ordinal name Chlamydomonadales is suggested for the unicellular forms of the Isokontae, exclusive of certain ones regarded as reduced from filamentous forms. Among the motile members, the author recognizes the Sphaerellaceae as distinct from the Chlamydomonadaceae, but considers the two as closely related lines of ascent. The two groups are contrasted as to character of cell wall, presence or absence of pits, number and distribution of contractile vacuoles, and character of chloroplast. Among the motile colonial forms the author does not regard resemblance in general type of the coenobia as indicative of affinity; for the classification of these forms he turns to cell structure. On this basis, Volvox and Stephanosphaera are classed with Sphaerella in the Sphaerellaceae, while the remaining motile coenobitic genera are grouped with Chlamydomonas in the Chlamydomonadaceae. The author, furthermore, does not regard the extreme differentiation of the coenobium of Volvox into reproductive and vegetative cells as the climax of the differentiation apparent in Pleodorina (Eudorina). Some material of *Pandorina morum* is reported upon in which many colonies showed from one to four cells, usually grouped near one end of the coenobium, which were much smaller than the rest and very poor in food material. These cells were not observed to divide, although in some cases the larger cells of the colonies were seen in division. This differentiation into vegetative and reproductive cells the author believes to have arisen independently in Volvox and Pandorina and that it represents in both cases "a fulfilment of the general tendency towards division of labor."

764. HODGETTS, WILLIAM J. Uronema elongatum, a new freshwater member of the Ulotrichaceae. New Phytol. 17: 159-166. Fig. 1-11. 1918.—The species is described from Birmingham, England. Details of cell structure, zoospore-formation and germination, attachment, and cell division are given. The author favors the retention of Uronema as a separate genus rather than to include it in Ulothrix, as suggested by Gaidukov.

765. HOWE, MARSHALL A. The marine algae and marine spermatophytes of the Tomas Barrera Expedition to Cuba. Smithsonian Misc. Coll. 68¹: 1-13. 1 fig. 1918.—The present list embraces 65 named species of algae and 4 referred to genus only. It is the most extensive list of Cuban algae thus far published and includes a considerable number of species believed to be attributed to Cuba for the first time. *Phormidium Hendersonii* is described as new. *Sarcomenia filamentosa* M. A. Howe, previously known only from the Florida type specimens, appears in the list. Notes on habitat and collections accompany the species. Two spermatophytes, *Halophila baillonis* Asch. and *H. Engelmannii* Asch., are included in the list.

766. MOORE, GEORGE T. Algological notes. III. A wood-penetrating alga, *Gomontia lignicola*, n. sp. Ann. Missouri Bot. Gard. 5: 211-224. Pl. 13-15. 1918.—The new species is described from fresh water on the island of Nashawena, near Woods Hole, Massachusetts. The filaments are usually unbranched, rarely somewhat branched, with the striking characteristic δf having most of the chlorophyll concentrated in the terminal cell (and in the spore from which the filament develops in case the former is still attached), the remaining cells being almost colorless. Of importance are the observations on the zoospores. Bornet and Flahault in *G. polyrhiza* reported biciliate zoospores of two sizes (without, however, observing any conjugation), while Wille records zoospores from the same species with four cilia. The present author found only biciliate zoospores in *G. lignicola*, and these all of one size. No conjugation was observed, and the belief is expressed that the presence of quadriciliate and biciliate spores in *Gomontia* does not in itself justify the assumption sometimes made that the latter are gametes. The zoospores may directly produce vegetative filaments or they may enlarge greatly to form resting spores which at maturity have thickened walls and frequently 'lamellate excrescences and protuberances, referred to by other authors as 'rhizoids.' The resting spores may rest for months or even years but ultimately germinate by the formation of from one to four filaments. Neither akinetes nor aplanospores were found and the author suggests the possibility that the aplanospores described by Bornet and Flahault from *G. polyrhiza* were merely zoospores which failed to escape and later came to rest. Bodies considered by some algologists as akinetes are identified by the author with resting spores developed from zoospores.

767. SETCHELL, W. A. Parasitism among the red algae. Proc. Amer. Phil. Soc. 57: 155-172. 1918.—The author excludes in the present paper all obvious epiphytes and endophytes and considers only those forms which upon one or more of the criteria of probable parasitism, viz., penetration of host, reduction of thallus, and loss of color, appear to him as undoubted parasites. An extensive historical account, with bibliography, is followed, by an enumeration, by families, of parasitic species of red algae. The list includes 42 species belonging to 29 genera, the latter distributed among 10 families. Including nine species and four genera, all as yet unpublished, parasitic species are known only from 11 of the 21 usually recognized families of red algae. Of these the Gigartinae (with 5 genera and 12 species) and the Rhodomelaceae (with 9 genera and 17 species) contain one-half or over of the known genera and species of parasitic red algae. The point is brought out that of these known parasitic species over 80 per cent are parasitic on another member of the same family, 16 per cent on red algae not of the same family as the parasite, and only 4 per cent on algae (brown) other than red. Attention is called to the case reported by Osterhout of the production of a dwarf parasitic generation on tetrasporic plants of *Agardhiella tenera* from the contents of a tetrasporangium acting as a whole. The author speaks of the similarity of the condition existing in this instance and that obtaining in many species of parasitic red algae which likewise show a close systematic relationship to their hosts. [See Bot. Absts. 1, Entry 1376.]

FUNGI

768. ADAMS, J. F. *Keithia* on *Chamaecyparis thyoides*. Torreya 18: 157-160. Fig. 1-2. 1918.—A new species, *Keithia Chamaecyparissi*, is described from Lakehurst, New Jersey. Previously described species have been reported on species of *Juniperus*, *Thuja* and *Tsuga*.

769. ARTHUR, J. C. Uredinales of Guatemala based on collections by E. W. D. Holway. II. Aecidiaceae, exclusive of *Puccinia* and form-genera. Amer. Jour. Bot. 5: 420-446. 1918.—The author includes detailed citations of collections and critical notes of 79 species included in 17 genera and here recorded on 116 hosts. Eight new species are described by Arthur and Holway, namely: *Ravenelia inquirenda*, *R. distans*, *R. bizonata*, *R. sololensis*, and *R. Main-siana* on Mimosaceae; *Uromyces socius* on Loranthaceae; *U. illotus* on Fabaceae; and *U. Salmeae* on Carduaceae. The author also describes *Uropyxis Crotalariae* on *Crotalaria* sp.

and Skierka Holwayi on *Thouinidium* sp., the latter representing the first species of this genus to be recognized in the flora of North America. A description is given of *Puccinosira Eupatorii* Lagerheim, which has previously been known only as an herbarium name.—H. S. Jackson.

770. ARTHUR, J. C. Uredinales of Guatemala based on collections by E. W. D. Holway. III. *Puccinia*, exclusive of species on *Carduaceae*. Amer. Jour. Bot. 5: 462-489. 1918.—The author gives detailed citations of collections and critical notes on 76 species occurring on 119 hosts distributed in 29 families. Descriptions of twelve new species of *Puccinia* are given. *P. infuscans*, *P. macra*, *P. Aegopogonis*, and *P. subdigitata* on *Poaceae*; *P. vergrandis* and *P. aucta* on *Dilleniaceae*; *P. obscurata* on *Ammiaceae*; *P. gilva* on *Heliotropiaceae*; *P. fuscata* on *Lamiaceae*; and *P. eximia* on *Rubiaceae* are described by Arthur and Holway. *P. degener* and *P. filiola* on *Lamiaceae* are described by [E. B.] Mains and Holway. The author transfers *Argomyces parilis* Arth. to *Puccinia*. The telial stages have been discovered for *Uredo circinata* Schw., *U. velata* E. & E., and *U. varia* Diet. and the species transferred to *Puccinia*. The full life history of *Aecidium tubulosum* Pat. & Gaill. and *Caeoma Arraccharum* Lindr. having been determined, new combinations based on these names are proposed and a full description of the latter given.—H. S. Jackson.

771. ATKINSON, GEO. F. Preliminary notes on some new species of agarics. Proc. Amer. Phil. Soc. 57: 354-356. 1918.—New species, all from the eastern United States, are described of the following genera: *Amanita*, 2; *Hypholoma*, 2; *Lactarius*, 2; and one each of *Lepiota* and *Pholiota*.

772. ATKINSON, GEO. F. The genus *Galerula* in North America. Proc. Amer. Phil. Soc. 57: 357-374. 1918.—*Galerula* (Karsten) is employed here in the broader sense of the genus with practically the same limits as those used by Murrill in 1917 in North American Flora. The genus name *Galera* (Quelet), 1872, is antedated by *Galera* (Blume) employed in 1825 for a genus of orchids. Atkinson gives here his conception of the limits of the genus, and presents a synopsis of the species of North America. Fifty-eight species are listed, including a considerable number hitherto undescribed. The paper represents a critical structural study of the genus.—H. M. Fitzpatrick.

773. BROWN, W. H. The fungi cultivated by termites in the vicinity of Manila and Los Baños. Philip. Jour. Sci. (Bot.) 13: 223-229. 1918.—The principal species found in the Philippine termite nests are the same as those reported from Ceylon and other tropical countries.—H. S. Yates.

774. BURT, EDWARD ANGUS. The *Thelephoraceae* of North America. IX. *Aleurodiscus*. Ann. Missouri Bot. Gard. 5: 177-203. Fig. 1-14. 1918.—Fourteen species of *Aleurodiscus* are described for North America, seven of these being hitherto undescribed, and three representing transfers from other genera. Figures are given for each species.—H. M. Fitzpatrick.

775. DRECHSLER, CHARLES. The taxonomic position of the genus *Actinomyces*. Proc. National Acad. Sci. U. S. A. 4: 221-224. 1918.—A summary of results obtained from cultural studies of a large number of species and strains of *Actinomyces*, both saprophytic and parasitic. The author concludes that there is no "adequate reason why the genus should not be classed, in an unqualified manner, with the *Hyphomycetes*, as a *Mucedineous* group with tendencies toward an erect *Isaroid* habit." A more detailed and illustrated account is to appear shortly in the Bot. Gaz.

776. GRAFF, PAUL W. Philippine *Basidiomycetes*. III. Bull. Torr. Bot. Club 45: 451-469. Pl. 15. 1918.—Preceding parts of this series were published in Philip. Jour. Sci. (Bot.) 8: 299-307. 1913. *Ibid.* 9: 235-254. 1914. This part is a check-list of rusts, smuts, and higher

basidiomycetes collected in the Philippine Islands. All the collections cited are preserved in the herbarium of the Bureau of Science, Manila. A list of synonyms accompanies the citation of each species. The citations include seven smuts, three rusts, and forty-five species or varieties of hymenomycetes or hymenomycetous lichens. *Polystictus tabacinus* var. *barbatus* (Murr.) and *P. tabacinus* var. *substygius* (Berk. et Br.) are given as new combinations for *Polystictus spadiceus* var. *barbatus* Graff and *Fomes spadiceus* var. *halconensis* Bres., respectively.—H. M. Fitzpatrick.

777. HARPER, EDWARD T. *Hypholoma aggregatum* and *H. delineatum*. *Mycologia* 10: 231-234. Pl. 12. 1918.—These species discussed particularly from the standpoint of nomenclature. The fruit-bodies and spores are figured.—H. M. Fitzpatrick.

778. HEDGCOCK, GEORGE G., ELLSWORTH BETHEL, AND N. REX HUNT. Piñon blister-rust. *Jour. Agric. Res.* 14: 411-424. Pl. 54-57. 1918.—A species of *Cronartium* native on species of *Ribes* and *Grossularia* in Colorado and Arizona is described as *C. occidentale* sp. nov. The aecidial stage is demonstrated to be a *Peridermium* on *Pinus edulis* and *P. monophylla*, and is given the form-name *Peridermium occidentale*. The essential differences between this rust and *C. ribicola* are shown in tabular form.—H. M. Fitzpatrick.

779. HOUSE, H. D. Report of the State Botanist. New York State Mus. Bull. 197: 7-110. 1917.—Announcement is made (p. 9-11) of the completion for the museum of 56 groups of edible and poisonous mushrooms cast in wax, being a part of the Peck Memorial Collection. On p. 16-19 is given a list of specimens of fungi added to the herbarium. Under the head of "New or interesting species of fungi, IV" (p. 25-51) is given an annotated list, new species being described of the following genera: *Cercospora*, 1; *Coryneum*, 1; *Cryptospora*, 1; *Cryptosporium*, 1; *Dendrodochium*, 1; *Diplodia*, 2; *Eutypella*, 1; *Gloeosporium*, 1; *Leptosphaeria*, 1; *Massarinula*, 1; *Microdiplodia*, 1; *Phoma*, 1; *Ramularia*, 1; *Septoria*, 3; *Sphaeropsis*, 3. A new variety of *Sphaerophragmium hystericinum* (Ell.) Sacc. is published. *Macrophoma ceanothi* (*Macrophoma peckiana* D. & H.) and *Sphaeropsis tulipastri* (*Sphaeropsis magnoliae* Ell. & Dearn.) appear as new names. *Microdiplodia paupercula* (*Diplodia paupercula* B. & Br.) and *Metasphaeria anthelmintica* (*Sphaeria anthelmintica* Cke.) are published as new combinations. In addition, a list of 119 species of New York fungi from the collections of C. H. Peck and the author is given, the identifications having been made by Saccardo. The new species and varieties of this collection were described by Saccardo in *Ann. Mycol.* 13: 115-122. 1915, and *Nuovo Gior. Bot. Ital.* 23: 185-197. 1916. They are indicated in the present report by distinctive type. [See Bot. Absts. 1, Entry 831.]

780. JACKSON, H. S. The Ustilaginales of Indiana. *Proc. Indiana Acad. Sci.* 1917: 119-132. 1918.—A total of forty-seven species is recorded for the state. All available collections are listed with critical notes on many of the species. An index to hosts is included.—H. S. Jackson.

781. JACKSON, H. S. The Uredinales of Indiana. II. *Proc. Indiana Acad. Sci.* 1917: 133-137. 1918.—The author records the occurrence in Indiana of fourteen species of rusts on as many hosts which have not been previously recorded in state lists. Partial synonymy and critical notes are given. (Supplementary to: Jackson, H. S. The Uredinales of Indiana. *Proc. Indiana Acad. Sci.* 1915: 429-475. 1916.)—H. S. Jackson.

782. JACKSON, H. S. The Uredinales of Delaware. *Proc. Indiana Acad. Sci.* 1917: 311-385. 1918.—The author lists all available collections and published records together with essential synonymy, critical notes and a detailed review of American culture work. A total of 129 species are recorded for the state, occurring on 232 host plants. *Aecidium Ivae* on *Iva ovata* is described as new. *Coleosporium carneum* (Bosc.) comb. nov. is prepared to replace *Coleosporium Vernoniae* B. & C. Indexes of species and hosts are included.—H. S. Jackson.

783. MAYOR, EUG. Contribution à l'étude de la flore mycologique des environs de Leysin. Bull. Soc. Vaud. Sci. Nat. 52: 113-149. 1918.—The author lists 170 species of parasitic fungi collected during July 1917 in the canton de Vaud, Switzerland, recording their occurrence on over 300 host plants. Critical notes and field observations are furnished for many of the species, particularly of the Uredinales, in which group 107 species are listed.—H. S. Jackson.

784. RHOADS, ARTHUR S. *Daldinia vernicosa*—a pyroxylophilous fungus. Mycologia 10: 277-284. Pl. 14. 1918.—The writer's observations show this species to be a pyroxylophilous fungus, and common on burnt wood of dicotyledonous plants. This fungus and *D. concentrica* are briefly discussed and contrasted. The spores of both species are said to shed the exospore wall when mounted in dilute alkaline solutions, and spores exhibiting this phenomenon are figured.—H. M. Fitzpatrick.

785. SEAVER, F. J., AND W. T. HORNE. Life-history studies in *Sclerotinia*. Mem. Torr. Bot. Club 17: 202-206. Pl. 3. 1918.—A species of *Sclerotinia* collected on the rootstocks of *Geranium maculatum* in Van Cortlandt Park, New York City, described as new under the name *Sclerotinia (Stromatinia) Geranii* sp. nov. The authors describe in detail culture work which shows that a species of *Botrytis* is the conidial stage. They state that the conidiophores were developed in pure culture from germinated ascospores. Both stages in the life history are figured.—H. M. Fitzpatrick.

786. SUMSTINE, D. R. Fungi of Chautauqua County, New York. New York State Mus. Bull. 197: 111-118. 1917.—A list, with brief notes on parasitic species, of 13 species of myxomycetes and 237 species of fungi.

787. TANAKA, TYOZABURŌ. New Japanese fungi. Notes and translations. V. Mycologia 10: 285-288. 1918.—*Physalospora minuta* I. Miyake, *Ascochyta mori* I. Miyake, *Stagnospora mori* I. Miyake, *Robillarda mori* I. Miyake, *Cytodiplospora mori* I. Miyake, and *Dimerosporium mori* Y. Endō are listed together with English diagnoses and annotations.—H. M. Fitzpatrick.

788. TEHON, LEO. R. Systematic relationship of *Clithris*. Bot. Gaz. 65: 552-555. Pl. 9. 1918.—Although the genus *Clithris* Fries is admitted to be of uncertain taxonomic relationships, facts are enumerated here which seem to show that it should be placed with the Phacidiales rather than with the Hysteriales. *Colpoma* Wallroth and *Sporomega* Corda are synonyms. Three new species are described on material collected by F. L. Stevens in Porto Rico: *Clithris clusiae*, *C. minor*, and *C. pardani*.—H. M. Fitzpatrick.

789. THAXTER, ROLAND. New Laboulbeniales from Chile and New Zealand. Proc. Amer. Acad. Arts and Sci. 54: 207-232. 1918.—*Diandromyces* and *Eudimeromyces* appear as new genera, with *D. chilensis* and *E. chilensis*, both from Corral, Chile, as the type species. New species, all from Chile, are described of the following genera: *Dichomyces*, 1; *Cantharomyces*, 4; *Herpomyces*, 1; *Corethromyces*, 2; *Cucujomyces*, 4. *Laboulbenia*, 2; *Coreomyces*, 2. From New Zealand, new species are described as follows: *Monoicomyces*, 1; *Corethromyces*, 3; *Cucujomyces*, 1. *Corethromyces andinus* (*Sphaleromyces andinus* Speg.) and *Cucujomyces elegantissimus* (*Stephanomyces elegantissimus* Speg.) appear as new combinations. The author gives critical notes on the three species of *Cucujomyces* described by Spegazzini and modifies the description of the genus by the latter who, it is stated, misinterpreted the antheridial characters.

790. YATES, H. S. Fungi from British North Borneo. Philip. Jour. Sci. (Bot.) 13: 233-240. 1918.—Twenty-three species are enumerated, two of *Meliola* and one each of *Hypocrea*, *Phaeodothiopsis*, and *Phyllosticta* being proposed as new.—Wm. H. Brown.

791. ZINSSMEISTER, C. L. *Ramularia* root-rots of ginseng. Phytopath. 8: 557-571. Fig. 1-8. 1918.—Two species of *Ramularia* are described as new *R. destructans* and *R.*

panacicola. These are parasitic on the roots of ginseng, apparently no other species of *Ramularia* ever having before been described as parasitic on roots of any host. Both species produce chlamydospores abundantly. [See Bot. Absts. 1, Entry 1034.]-H. M. Fitzpatrick.

MYXOMYCETES

792. SUMSTINE, D. R. Fungi of Chautauqua County, New York. New York State Mus. Bull. 197: 111-118. 1917. [See Bot. Absts. 1, 786.]

FLAGELLATES

793. SCHAEFFER, ASA A. A new and remarkable diatom-eating flagellate, *Jenningsia diatomophaga* nov. gen., nov. spec. Trans. Amer. Microsc. Soc. 37: 177-182. Pl. 13. 1918.—This new and exclusively holozoic member of the Euglenineae is described from near Knoxville, Tennessee. So far as observed the food of this flagellate consists entirely of living diatoms, which are captured in a truly predatory manner while moving. Locomotion, structure of cell, asexual reproduction, and feeding habits are discussed.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

[Unsigned abstracts are by the editor.]

794. ASHE, W. W. Additions to the arborescent flora of North Carolina. Jour. Elisha Mitchell Sci. Soc. 34: 130-140. 1918.—The author records several additions to Coker and Totter's recently published "Trees of North Carolina." The additions include descriptions of a new species of *Hicoria*, two new species and one new variety of *Amelanchier*, and several new combinations.

795. BEAUVERD, GUSTAVE. Esquisse synécologique comparative de deux marais des environs de Baulmes. Bull. Soc. Vaud. Sci. Nat. 52: 17-93. 1918.—The author presents a general discussion of the flora of the region concerned, mainly from an ecological standpoint, gives a list of the species represented, and characterizes about a dozen new varieties and forms of endemic flowering plants.

796. BLAKE, S. F. Further new or noteworthy Compositae. New spermatophytes collected in Venezuela and Curaçao by Messrs. Curran and Haman. New plants from Oaxaca. [Three separate titles.] Contrib. Gray Herb. Harvard Univ. New Ser. 53: 23-65. Pl. 1, fig. 1-14. 1918.—In the first paper the author describes a new species of *Aphanostephus* from Texas, one of *Diplostephium* and one of *Verbésina* from Colombia, one of *Liabum* from Guatemala, and one of *Cirsium* from Oregon. New combinations appear under *Steiractinia* and *Gynoxis*. The second article records the results of a study of a collection of plants made in Venezuela and on the Island of Curaçao during the spring and summer of 1917. Seventeen species are described, distributed among several genera, and two genera are characterized as new to science, namely, *Hecatostemon* of the Flacourtiaceae and *Oxycarpha* of the Compositae. *Wikstroemia* Schrad. is recognized as a valid generic name and to it are transferred thirty-one species, mostly from *Haemocharis*, *Laplacea*, and *Lindleya*. Under the third title the author places on record the results of studies of a collection of plants made in Oaxaca, Mexico, by Messrs. Conzatti, Reko, and Makrinus in 1917. Thirteen new species of flowering plants, belonging to several different genera, are described, and one new genus (*Schismocarpus*) of the Loasaceae is proposed.

797. COCKERELL, T. D. A. Notes on the flora of Boulder County, Colorado. Torreya 18: 177-183. 1918.—Additions to the phanerogamic flora of Boulder County are listed with notes

on several species. *Heliomeris* of Nuttall is recognized as of generic rank, and to it are referred eight species and one variety. New combinations also occur under *Oxytropus*.

798. HEIMLICH, LOUIS FREDERICK. The trees of White County, Indiana, with some reference to those of the state. Proc. Indiana Acad. Sci. 1917: 387-471. Pl. 1-32. 1918.—Sixty-two species of trees are recorded from White County, as contrasted with one hundred and twenty-five from the entire state. The paper is illustrated with distribution maps and several line drawings.

799. MACBRIDE, J. FRANCIS. New or otherwise interesting plants, mostly North American Liliaceae and Chenopodiaceae. Contrib. Gray Herb. Harvard Univ. New Ser. 53: 1-22. 1918.—The present paper embodies the results incidental to a study of several collections of plants, chiefly from western North America. New species are described in *Tricyrtis*, *Atriplex*, *Lotus*, *Lomatium*, *Lycium*, and *Cirsium*. A few new varieties are also characterized, and several new combinations have been made, particularly in *Zygadenus*, *Atriplex*, *Madhuca*, and *Lycium*.

800. PIPER, C. V. New plants of the Pacific Northwest. Proc. Biol. Soc. Washington 31: 75-78. 1918.—Piper describes the following species as new to science: *Epilobium cinerascens*, *Vaccinium coccineum*, *Mertensia bella*, *Castilleja indecora*, *Grindelia Andersonii*, and *Hoorebekia curvata*.

801. SCHNEIDER, CAMILLO. Notes on American willows. II. The species related to *Salix glauca* L. Bot. Gaz. 66: 318-353. 1918.—The present paper is concerned with a discussion of *Salix glauca* L. and its immediate allies, a group consisting of ten species, including two new ones (*S. fullertonensis* and *S. anamesa*), and several varieties.

802. SCHÖNLAND, S. A summary of the distribution of the genera of South African flowering plants. Trans. Roy. Soc. S. Afric. 7: 19-58. 1918.—This paper consists of an enumeration of the genera of South African flowering plants with brief notes on their geographical distribution.

803. BLAKE, S. F. A revision of the genus *Viguiera*. Contrib. Gray Herb. Harvard Univ. New Ser. 54: 1-205. Pl. 1-3. 1918.—This paper is concerned not only with a revision of the genus *Viguiera*, but it includes a general discussion of the natural relationship of several closely related genera of helianthoid Compositae; and from rather extended comparative studies the author proposes a rearrangement of certain genera of this group. *Viguiera*, as here circumscribed, is made somewhat more inclusive than formerly understood, mainly by combining with it several species hitherto referred to *Gymnolomia*. The genus *Viguiera* is divided into three subgenera, namely *Amphilepis*, a group of twelve Mexican species, *Calanticaria*, to which are referred one hundred and twenty-four species ranging in distribution from the United States to Argentina and Brazil, and *Yerbalesia*, a small group of five species confined to Paraguay, Uruguay and adjacent Argentina. In addition to these there are two little known species of doubtful affinity. Altogether one hundred and forty-three species of *Viguiera* are recognized, and of these twenty-eight are new to science. Several new varieties are also described, and a relatively large number of new names and new combinations have been made, as would naturally result from a critical study of such a large and widely distributed group of plants. A list of the exsiccatae cited and a complete index of accepted names, synonyms, etc., add materially to the usefulness of the work.

804. COCKAYNE, L. Notes on New Zealand floristic botany, including descriptions of new species, &c. (No. 3). Trans. and Proc. New Zealand Inst. 50: 161-191. Pl. 9, 10. 1918.—In addition to critical notes on New Zealand plants, new species are described in the following genera: *Carmichaelia*, *Cassinia*, *Epilobium*, *Haastia*, and *Veronica*.

805. FERRIS, ROXANA STINCHFIELD. Taxonomy and distribution of *Adenostegia*. Bull. Torr. Bot. Club 45: 399-423. Pl. 10-12. 1918.—The author presents a revision of this west American genus, tracing its distribution from southeastern Montana and Washington to northern Mexico. Twenty-one species are recognized of which five are described as new to science.

806. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. IV, Part 4, P. 93-110, pl. 140-143. William Applegate Gullick: Sydney, 1918.—This number contains descriptions and illustrations of *E. redunca* Schauer, *E. accedens* W. V. Fitzgerald, *E. cornuta* Labill., and *E. Websteriana* Maiden. Ibid. Part 5, P. 111-135. Pl. 144-147. 1918. Contains descriptions and illustrations of *E. Lehmanni* Preiss, *E. annulata* Benth., *E. platypus* Hook., *E. spatulata* Hook., *E. gamophylla* F. v. M., and *E. argillacea* W. V. Fitzgerald.

807. NIEUWLAND, J. A. *Heterothrix* (B. L. Robins.) Rydb. a synonym, and other notes. Amer. Mid. Nat. 5: 224-225. 1918.—The author proposes the generic name *Pennellia* to replace *Heterothrix* Rydb., not Muell. Arg.

808. PAU, C., AND C. VICIOSO. Plantas de Persia y de Mesopotamia. Trab. Mus. Nac. Cienc. Nat. Madrid. Ser. Bot. Num. 14: 1-48. Pl. 1-5. 1918.—The authors present a list of flowering plants and ferns, collected in 1899 in Persia and Mesopotamia; the list includes descriptions of about forty species and several varieties of flowering plants characterized as new to science.

809. PETRIE, D. Descriptions of new native flowering-plants. Trans. and Proc. New Zealand Inst. 50: 207-211. 1918. Four new species and one variety are described in *Myosotis*, one new species in *Pterostylis*, and one in *Poa*—all are from New Zealand.

810. ROBINSON, B. L. I. Diagnoses and notes relating to tropical American Eupatorieae. II. A descriptive revision of the Colombian Eupatoriums. III. Keyed recensions of the Eupatoriums of Venezuela and Ecuador. [Contrib. Gray Herb. Harvard Univ. New Ser., No. LV.] Proc. Amer. Acad. 54: 235-367. 1918.—Article I contains descriptions of thirty-seven species and seven varieties of *Eupatorium* new to science; the species are distributed as follows: twenty-one from Colombia, seven from Venezuela, two from Mexico, two from Panama, and from Guatemala, Jamaica, Porto Rico, Santo Domingo and Ecuador one each. A new species of *Fleischmannia* and one of *Kuhnia* from Mexico are included. Article II consists of a critical revision of the Eupatoriums of Colombia. Ninety-three species and several varieties are recognized. The group is keyed to sections, and there is a key to the species of each section. A lucid description is given of each species, and this is followed by bibliography and the citation of exsiccatae. Article III is a similar presentation of the Eupatoriums of Venezuela and Ecuador. Thirty-four species are recognized from Venezuela and fifty from Ecuador.

811. ROLFE, R. A. *Gongora latisejala*. Curtis's Bot. Mag. Pl. 8766. 1918.—A new species of orchid indigenous to Colombia, described and illustrated from plants grown at the Royal Botanic Gardens, Kew, England.

812. SARGENT, C. S. Notes on North American trees. II. *Carya*. Bot. Gaz. 66: 229-258. 1918.—The author gives a conspectus of the species of hickory occurring in the United States, recognizing fifteen species and a number of varieties and forms several of which are new to science. An enumeration of the supposed hybrid hickories is also included and to some of these new binomial names have been assigned.

813. SCHNEIDER, CAMILLO. Notes on American willows. I. The species related to *Salix arctica* Pall. Bot. Gaz. 66: 117-142. 1918.—This paper is concerned with a discussion of *Salix arctica* Pall. and its immediate allies, involving six species. Several new varieties and forms are characterized.

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for the remainder of volume 1 and also for the first three issues of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although they are shown on cover page 1 of present issue.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Other changes will be reserved till the end of the present volume. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

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BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. I

DECEMBER, 1918

No. 4

ENTRIES 814-1140

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

[Unsigned abstracts are by the editor.]

814. CLUTE, WILLARD N. Botany laboratory equipment. *School Sci. Math.* 18: 492-494. June, 1918.—Something seems to be the matter with botany, it will soon come to an end in school through sheer inanition. Registration in the study has gone down 50 per cent in ten years. Botany should have a more practical turn. Too many classes are still engaged in flower analysis, others give too much time to morphology and the alternation of generations. Public demands information about food, fiber and other economic plants. There should be a collection of plants growing in the open, supplemented by a greenhouse. A museum of plant products is also desirable. Frequent field trips must be conducted. General science threatens to include the cream of botany; should this succeed special botany instruction will follow the lepidodendron into oblivion.—*Gundersen*.

815. SHINN, HAROLD B. Biology in the high school of tomorrow. *School Sci. Math.* 18: 495-499. June, 1918.—Too often discussion of a school question passes into destructive criticism of everything and everybody. In high school botany there is no room for long discussions of algae, ferns or mosses; there should be more planting and care of house plants and grounds. Corn may be studied as intensively as Huxley's crayfish. Biology will become economic, but not mercenary. The commercial courses of today are not educational because their ideal is the dollar. Botany will teach soil fertilization, sterilization and inoculation. There will be more work with forestry, pruning, grafting and breeding. In zoology the study of mammals will be emphasized. High school botany and zoology have advanced quite beyond that of the university, which is now a drag on the high schools. The future text will be written by an advanced high school teacher and the universities will cease to impose their neomonastic training.—*Gundersen*.

816. HOLT, VESTA. Agriculture or botany, which? *School Sci. Math.* 18: 505-506. June, 1918.—Botany, as a high school subject, has been in a fair way to be laid on the shelf alongside of astronomy, as not practical. A course in "agricultural botany" proved a success in the Medford, Oregon, High School. The chief industry of the region was fruit raising. Forms of plant life were studied giving attention to physiology, growth and environment. Seed germination, soils, plant pathology, grafting, and plant breeding were then taken up. Also a soil survey with samples, and a collection and study of weeds.—*Gundersen*.

817. NESS, H. Agricultural text-books for our public schools. *Science* 48: 484-486. Nov. 15, 1918.—Agriculture, as a subject in our public schools, will fail to educate and enter-

tain if heavily burdened with dry recipes for increasing the number of dollars, or lectures upon more physical operations of running a farm. The highly interesting biological, chemical and physical principles underlying these operations would, however, not fail to stimulate and elevate the young mind, as adding interest to the operations in themselves. The language, too, in which these subjects are taught, should be in a simple, yet good virile English. In the greater number of these "text-books on agriculture for the public schools," the pupils are expected to cover more agricultural subjects, frequently crowded together in an incoherent way and stripped of all philosophical connective tissue, than any student in the state agricultural colleges, where he has a four year's course with specialists for teachers, supplied with all the equipments for demonstration. Author urges a return to the idea of "a book about agriculture" and giving up the idea of "productive agriculture" for our public schools.

818. KIRKWOOD, J. E. Opportunity and obligation in botanical teaching. *School Sci. Math.* 18: 580-587. Oct., 1918.—Systematic botany for years was the main subject of botanical study and teaching. As the whole of botany consisted in the naming of plants it led to no economic benefit nor to education of cultural value. Laboratory physiology and morphology came as the next stage. The present tendency is toward practical considerations. Scientific agriculture, forestry, pharmacy and bacteriology are closely allied to botany. In the work of the plant breeders lie inconceivable possibilities for food production. The importance of plant pathology is not realized. No line of teaching has greater possibilities than that which deals through the life of plants with the products of the soil. The knowledge of the dependence of human life on plants has a fundamental educational value.—*Gundersen*.

ECOLOGY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

819. ANDREWS, E. F. The relation between age and area in the distribution of plants. *Science* 47: 142-143. Feb. 8, 1918.—The author, agreeing with Sinnott that other factors than age help to determine the area occupied by a species, notes that the recently naturalized *Lonicera japonica* now has a wider area in the southeastern states than the native longleaf pine. Furthermore this recent immigrant, unlike most introduced weeds, is not confined to cultivated fields and waste places, but invades woodlands and ravines from the sea level to the mountain tops.

820. BAKKE, ARTHUR L. Determination of wilting. *Bot. Gaz.* 66: 81-116. 5 figs. Aug., 1918.—Using the hygrometric paper method of investigating transpiration, data are obtained demonstrating the fact that permanent wilting is a definite physiological condition and that the time of its occurrence may be exactly and readily determined by observing the fluctuations of the index of foliar transpiring power. As the time of permanent wilting approaches, the index of transpiring power is considerably lowered, it remains at or near equilibrium for a definite period and then undergoes a decided but rather slight rise. For interpreting these fluctuations the conception of continuous water columns within the plant is assumed and in the condition of equilibrium these columns are supposed to be in a state of highest possible tension. Then the transpiration exerts a force sufficient to cause the serious rupture of the water columns and permanent wilting occurs at the instant of such rupture, being indicated by a slight increase in transpiring power caused by the lessened resistance to the outward passage of water following the break of the water columns. It is suggested that the duration of the period of equilibrium may give a measure of the drought resistance of different plants. Permanent wilting is also shown to occur earlier in older leaves, the time interval varying according to age.

Graphs of the daily march of foliar transpiring power show that the maximum occurs earlier in the day than the maximum evaporating power of the air, and that the maximum is

followed by a decided fall and subsequent recovery, the second maximum being usually somewhat smaller than the earlier one. *Helianthus* plants were used in this investigation which was conducted in the laboratories of the University of Chicago.—*Geo. D. Fuller.*

821. BLODGETT, F. H. Weather conditions and crop diseases in Texas. Mem. Torr. Bot. Club 17: 74-78. June, 1918.—Suggests that organisms commonly regarded as most sensitive to substratum, such as parasitic fungi, mosses and hepatics, may respond to local weather conditions. Proof is offered that *Glomerella Gossypii* Edg. responded to distribution and periodicity of rainfall in Texas, as illustrated on a greater scale than is usually possible by the condition of cotton. Winds may also carry infection, possibly as far as 20 or 30 miles; and it is suggested finally that application of possibly infected irrigation water is still another source of danger.—*Norman Taylor.*

822. CAMPBELL, D. H. The Origin of the Hawaiian flora. Mem. Torr. Bot. Club 17: 90-96. June, 1918.—The evidence of Wallace, Guppy, and others who have shown that the flora of Hawaii is largely endemic and of Asiatic rather than American affinities, is here supplemented from a study of hygrophilous liverworts and filmy ferns. The latter, because of their rain-forest habit, are not suited to overseas transportation, and must according to the author have existed in Hawaii since its connection with some mainland, now under the sea. Plants of this type now existing show relationship with Java and the Malayan region and Australasia rather than America. So greatly is this true that of 40 species of Pteridophytes, 38 are found in Hawaii and Australasian-Malaysian regions but not in America, while only two are found in Hawaii and America but not in the Orient. Other evidence, such as the essential continuity of shallows between Hawaii and the East, and the great deeps between those islands and America are noted, and the article closes with a tabulation of flowering plants, based on Hillebrand, showing 45 Hawaiian-Australasian-Malaysian, but not American genera and 7 of Hawaiian-American distribution but not Australasian-Malaysian.—*Norman Taylor.*

823. DUNNEWALD, T. J. Vegetation as an indicator of the fertility of sandy pine plains soils in northern Wisconsin. Jour. Amer. Soc. Agron. 10: 19-23, 1 fig. Jan., 1918.—In making a soil survey of a proposed Forest Reserve area in northern Wisconsin, it was noticed that cut-over sand plains differ widely in the character of their second growth. In the most sandy portions, there is but a sparse second growth of trees, the ground being covered largely by *Vaccinium*, *Pteris*, and *Myrica*; the trees where present are largely *Pinus resinosa* and *P. Banksiana*. Where the sand is more loamy, there is a good second growth of various trees including *Pinus Strobus*. It is concluded that the character and size of the plants of cut-over lands is a safe indicator of agricultural values. "The heavier growth indicates a higher content of plant food, the presence of more fine material in the soil, and especially a greater capacity of the soil to retain moisture and to enable vegetation and future crops to resist periods of drought." [Abst. in Exp. Sta. Rec. 39: 115-116. 1918.]—*H. C. Cowles.*

824. FARROW, E. PICKWORTH. On the ecology of the vegetation of Breckland. I. General description of Breckland and its vegetation. II. Factors relating to the relative distribution of *Calluna* heath and grass heath in Breckland. III. General effect of rabbits on the vegetation. IV. Experiments mainly relating to the water supply. V. Observations relating to competition between plants. VI. Characteristic bare areas and sand hammocks. Jour. Ecology 3: 211-228. 4 fig. 3 pl. Dec., 1915. *Ibid.* 4: 57-64. 1 fig. 3 pl. June, 1916. *Ibid.* 5: 1-18. 1 fig. 6 pl. Mar., 1917. *Ibid.* 104-112. 1 fig. 2 pl. June, 1917. *Ibid.* 155-172. 2 fig. 1 pl. Dec., 1917. *Ibid.* 6: 144-152. 3 pl. June, 1918.—Situated in Norfolk and Suffolk counties, England, upon sandy soil with only 22½ inches of annual rainfall there is an area developing a vegetation consisting of a transition from a heath, dominated by *Calluna vulgaris*, to a grassland with a short close turf in which *Festuca ovina* and *Agrostis vulgaris* are the most abundant species. Attempts at cultivation have not proved successful and the native vegetation constitutes the nearest approach to continental steppe conditions to be found in Great Britain.

Investigating the effects of a rabbit population on the vegetation Farrow has shown that the presence and the activities of these animals constitute a cause of retrogression sufficient at

times to change a pine forest through *Calluna* heath and *Carex arenaria* associations to a dwarf grass or a *Cladonia* heath. Experiments with irrigation and with the application of manure tend to show that both sterile soil and lack of soil moisture are factors in limiting the rate of growth and the luxuriance of the vegetation. This increased growth with improved conditions results in a decrease in the number of species in the area, since the more rapid growth of certain plants like *Agrostis vulgaris* smothers less vigorous ones, such as *Festuca ovina*. Evidence is also presented that such plants as *Pteris aquilina* and *Pinus* often succeed in competition owing to their dead foliage excluding the light from their competitors causing etiolation and decay. Often the retrogression begun by rabbits is continued by sand blasts and the retrogression shows exactly the reverse order of the succession inaugurated by irrigation, being particularly noticeable in the *Agrostis vulgaris* giving place to *Festuca ovina* wherever the sand blast becomes intensive. Once initiated, bare areas tend to increase, the sand assisting in destroying the vegetation both by direct attack and by removing the substratum, leaving clumps of grass upon the tops of small hummocks which are being constantly undermined. With the checking of wind erosion in such bare areas *Polytrichum* and *Cladonia* become agents of stabilization and revegetation. [Rev. by Fuller in Bot. Gaz. 67: 181-182. 1919.]-Geo. D. Fuller.

825. FINK, BRUCE. The distribution of fungi in Porto Rico. *Mycologia* 10: 58-61. Mar., 1918. In a two months' collecting trip in the winter of 1915-16 it was noted that the rusts, imperfect fungi, black Perisporiaceae, crustose lichens, pyrenomycetes, and Hysteriaceae are abundant. Foliose and fruticose lichens are relatively infrequent. The larger basidiomycetes are strikingly infrequent.—H. C. Cowles.

826. GLEASON, H. A. Local distribution of introduced species near Douglas Lake, Michigan. *Torreyia* 18: 81-89. May, 1918.—A continuation of earlier studies (*Bull. Torrey Bot. Club* 41: 511-521. 1914) and a confirmation of them. Introduced species seem unable to persist, in competition with native ones, the further removed they are from source of local introduction. This is evidenced by the loss in three years of many introduced species at a summer resort, among the aspens (where, however, those species that survived spread somewhat), and in hardwood clearings. In the latter many 1914 inhabitants died out and were replaced by a new crop of weeds in 1917. 25 species were common to both years and presumably more likely to endure later on. Methods of introduction are dealt with, such as travel through the forest, horse-dung, and otherwise. Concluding notes on behavior of certain introduced species, such as rate of increase, sudden exhaustion, a complete disappearance of unstable ones, confirm general ideas of the precarious and evanescent nature of much introduced vegetation.—Norman Taylor.

827. HARPER, R. M. The vegetation of the Hempstead Plains. [Long Island, N. Y.]. *Mem. Torr. Bot. Club* 17: 262-286. 3 fig. 1 pl. June, 1918. A description of an area designated by the writer as a prairie, but not certainly assignable to this vegetation type by others. It is now about 10 square miles in extent and essentially treeless. Soil is mostly sand and pebbles, perhaps outwash watered from the terminal moraine just to the north.—The vegetation is listed according to the frequency of the 4 trees, 11 shrubs, 40 herbs, and 3 cryptogams, which the author credits to the open plains. Of the herbaceous vegetation, dominated by *Andropogon scoparius*, the estimated yield per acre, when cut in October was 8220 pounds,—air dried 5975 pounds. As showing the influence of water in changing the vegetation a census of the species of the valley of Meadow Brook, which used to flow through the plains but is now nearly dry, lists 15 woody species, 51 herbs and a moss,—nearly, but not quite all different species from those of the plains. There is also a description of a curious "island of trees," dominated by *Pinus rigida*, found in the open plains; some speculation as to the origin of the vegetation of the area and its affinities with other regions in the eastern United States. Fire may have played its part in determining the present condition of the vegetation; and the author points out the probable rapid destruction of a unique type of vegetation within a few years, due to its being the site of Camp Mills and to other causes.—Norman Taylor.

828. HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of desert Loranthaceae. Mem. Torr. Bot. Club 17: 307-315. June, 1918.—Three species of Phoradendron growing upon a number of different hosts in the Arizona deserts have been investigated and the osmotic concentration of the tissue fluids are found by the freezing point method to be approximately twice as great as that of related species growing in the montane rain forests of Jamaica. The osmotic concentration of the tissue fluids of these desert parasites is generally greater than that of the host, a typical example showing the average concentration of the former to be 28.63 and of the latter 24.50 atmospheres.—Geo. D. Fuller.

829. HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of phanerogamic epiphytes. Amer. Jour. Bot. 5: 490-506. Nov., 1918.—Investigation of the osmotic concentration of the tissue fluids of epiphytic Bromeliaceae, Orchidaceae, Piperaceae, and Gesneraceae from the montane rain forests of Jamaica and from the subtropical forests of Florida show that the osmotic concentrations of the species from the former habitat is lower than that from the latter. In both regions the osmotic concentration for the epiphytes is lower than that of terrestrial vegetation. In the Jamaican forests the epiphytes show from 37 to 60 per cent of the concentration characteristic of herbaceous terrestrial vegetation and from 28 to 45 per cent of that of ligneous terrestrial plants.—Geo. D. Fuller.

830. HAZEN, T. E. The trimorphism and insect visitors of *Pontederia cordata*. Mem. Torrey Bot. Club 17: 459-484. 12 fig. 2 pl. June, 1918.—Examination of many plants shows that *Pontederia cordata* has three distinct types of flowers (1) short-styled, with the longest and mid-length stamens protruding, (2) mid-styled, with only the long stamens protruding, (3) long-styled, mid-stamens only just protruding. In (3) the style is itself exerted, in (2) only very slightly so, and not at all in (1). "The ratio of the average length of the long pistils to that of mid-length pistils is approximately as 100 to 60; and the average height of the long pistils to that of the short ones is as 100 to 22." This trimorphism may obviously result in six legitimate crosses between six sets of stamens and the three different lengths of pistils, which is illustrated by a diagram. The different style lengths are found on different plants, which show some tendency to make locally exclusive growths. Insect visitors recorded are 10 Lepidoptera, 4 Hymenoptera, 1 Diptera, and perhaps others. Self pollination is probably possible but rare, a constant procession of insects insuring almost universal cross-pollination. The author also records that *Pontederia cordata* at Arcola, N. J., where the studies were made, is, contrary to usual notions, found in a place that is "daily bathed or even flooded by tide water." [Rev. by Wylie in Bot. Gaz. 67: 271-272. 1919.]—Norman Taylor.

831. HOUSE, H. D. Vegetation of the eastern end of Oneida Lake [N. Y.]. Bull. for 1917, New York State Museum 197: 61-71. May, 1918. [Illus.]—A description of Geology, Climate, Life Zones, Forests, Shore-vegetation, etc. with lists of species given for some of the plant associations.—Norman Taylor.

832. MACCAUGHEY, V. Strand Flora of the Hawaiian Archipelago. I. Geographical relations, origin and composition. Bull. Torrey Bot. Club 45: 259-277. July, 1918.—After discussion of geographical isolation of the islands, and tremendous depths that occur in the sea near them, ocean currents are shown to be more effective from America than the Old World, as a possible source of strand colonizers. Methods of introduction as outlined by Schimper, Wood-Jones, Tansley and Fritsch, Hooker, Mosely, and Guppy are dealt with, and the peculiarly endemic nature of the Hawaiian strand flora, is emphasized. The latter is the remarkable feature of the flora of the strand, which in most oceanic islands is nearly cosmopolitan. Of interest is the fact that sea-borne colonists of the Hawaiian strand are at least partly of American origin, while the pteridophytes of the interior (see Bot. Absts. 1, Entry 822) rain-forest, not at all suited to oversea transportation, are only very slightly so. Thirty-two species are listed as endemic littoral or practically littoral plants which may well exceed that from any other region in the world. With only something over 80 species recorded from the strand these 32 endemics are extraordinary. Of these, 13 are woody plants and 19 herbs,

suggesting that woody species do not outnumber herbaceous ones in this strand element of the Hawaiian endemics, contrary to the percentages for the total endemics of the islands as given by Sinnott and Bailey (Ann. Bot. 28: 574. 1914).—Norman Taylor.

833. NICHOLS, GEORGE E. The vegetation of northern Cape Breton Island, Nova Scotia. Trans. Connecticut Acad. Arts and Sci. 22: 249-467. 70 figs. 1918.—This island, lying between 45.5 and 47 degrees North lat., possesses upon the lowlands along the coast a climax forest of the deciduous type, in which *Fagus grandifolia*, *Acer saccharum*, and *Tsuga canadensis* are dominant. In contrast to this, the granitic uplands constituting the whole interior of the island display as a climax vegetation a coniferous forest composed of *Abies balsamea*, *Picea canadensis* and a small amount of *Betula papyrifera*. The successions leading to these forests are traced and the relationships of the two climax types are considered. They appear to be equally mesophytic as shown by similar species in the undergrowth, in which *Taxus canadensis*, *Acer spicatum*, *A. pennsylvanicum*, and *Sorbus americana* are the principal shrubs, while among the herbaceous vegetation are *Phegopteris* spp., *Aspidium* spp., *Clintonia borealis*, *Linnaea borealis*, *Cornus canadensis*, *Actaea alba*, and *Viola canadensis*. Upon the destruction of the deciduous forest of the lowlands by cutting or fire it is succeeded by one in which *Abies* and *Picea* are dominant. This and the presence of considerable numbers of *Abies* of small size in the deciduous forest raises the question of why the balsam fir is apparently unable successfully to compete with the beech and maple. Nichols finds that its seedlings are fairly tolerant of shade and that its failure is due to its shortness of life, reaching maturity in about a century, and to its susceptibility to fungous diseases.

The factors in regard to which the upland climate differs from the lowland appear to be the greater extremes of temperature in the former situation and the fact that the uplands which have an average elevation of 1000 feet are frequently enveloped in fog and low-hung clouds which are absent below. Large areas of the more exposed upland have an aspect similar to the tundra due to the degeneration of the conifer forest to a "Krummholz," a coniferous heath and even to a shrub heath. These associations constitute "the barrens" which Nichols regards as possessing an edaphic rather than a climatic vegetation.

Several problems are elucidated, especially those connected with bogs. The sphagnum are placed in five ecological classes ranging from aquatic to comparatively xerophytic in habit. The mesophytic and xerophytic types are cushion-forming and through their agency numerous raised bogs are developed. These seem equivalent to the "Hochmoor" of Europe and seem to require for their development a climate characterized by abundant precipitation, relatively low atmospheric humidity, cool summers, and the absence of the extremely low winter temperatures found on the mainland. Among the more important edaphic factors, an impervious substratum stands first and is afforded by the glaciated granite surface. This assists in the retention of the water supply which comes exclusively from rain and not from springs. The cushion-forming sphagnum, coming in during the later stages of bog development, result in a convex surface, the central portion of the bog often rising from 5 to 15 feet above its margin. This surface is hummocky, rather firm and springy and usually relatively dry. In addition to the sphagnum its vegetation consists of such other mosses as *Polytrichum* and *Racomitrium*, and some fruticose lichens such as *Cladonia* spp., small ericaceous shrubs and scattering, very stunted individuals of *Picea mariana* and *Larix laricina*. Among other details is the description of subsequent bog ponds formed by the impervious sphagnum peat damming back the water draining down gentle rock slopes. These also act as reservoirs for the rainfall insuring to adjacent areas a constant supply of moisture throughout the season.

In arranging the various plant communities, Nichols uses a new scheme of classification in which the association is the fundamental unit. The association complexes constitute edaphic formations and these in turn make up climatic formations.—Geo. D. Fuller.

834. NICHOLS, GEO. E. The sphagnum moss and its use in surgical dressings. Jour. New York Bot. Gard. 19: 203-220. Sept., 1918.—While the primary purpose of this paper is indicated in the title, it contains notes on the ecology of Sphagnum, some details of its struc-

ture, and descriptions of the peculiarities of various species. The distribution of various types of bogs in Maine and in the eastern provinces of Canada is briefly sketched.—*Geo. D. Fuller.*

835. PETRY, LOREN C. Studies in the vegetation of New York State. II. The vegetation of a glacial plunge basin and its relation to temperature. *Bull. Torr. Bot. Club* 45: 203-210. 3 fig. May, 1918.—In certain rock basins of glacial origin near Syracuse, N. Y., very low temperatures of both soil and air prevail throughout the year, the differences between the rim and bottom of the depressions often amounting to as much as 15°C. These low temperatures are shown to be the controlling factors in causing the presence of plant associations characterized by the dominance of plants usually found only in much more northern habitats. Their local distribution is shown to coincide very exactly with the areas bounded by the isothermal lines of low temperature. [Rev. by Fuller in *Bot. Gaz.* 67: 184. 1919.]—*Geo. D. Fuller.*

836. PITTIER, H. Our present knowledge of the forest formations of the Isthmus of Panama. *Jour. Forestry* 16: 76-84. Jan., 1918.—"This is a brief account of some results of the study of the flora of Panama made in connection with the general biological survey organized by the Smithsonian Institution." More than half of the country is covered by forests, most of the remaining territory being savanna. Most of the forests are primeval and to be classed as rain-forests, with a dominance of mesophytic dicotyledonous trees. Cauliflory and plank roots are common, and the trees are conspicuously arranged in tiers. Monsoon forests occur on the Pacific slope, *Cavanillesia platanifolia* being everywhere characteristic. [Unsigned rev. in *Geographical Review* 5: 417. 1918.]—*H. C. Cowles.*

837. SMITH, WM. G. The distribution of *Nardus stricta* in relation to peat. *Jour. Ecol.* 6: 1-13. 2 pls. 1 map. Mar., 1918.—This grass is widely distributed on moor and heath in many parts of Europe, the present study being made in the hilly parts of northern Britain. Here it forms the dominant member of a plant association marginal to areas of retrogressive peat. It typically occurs upon material that has been redistributed from exposed and elevated masses of peat through the agency of water, wind, or other factors. This community is relatively fixed, fairly extensively developed, and forms a rather important although somewhat unproductive part of the grazing lands in the subalpine region of the central and northern hills of Britain. The usual composition of the association is determined and the effect of such factors as spring water, manuring, grazing, and burning is investigated.—*Geo. D. Fuller.*

838. TAYLOR, NORMAN. A quantitative study of Raunkiaer's growth-forms as illustrated by the 400 commonest species of Long Island, N. Y. *Mem. Brooklyn Bot. Gard.* 1: 486-491. 1918.—Upon grouping the species for (1) the vicinity of New York, (2) the whole flora of Long Island and (3) the 400 commonest plants upon Long Island, according to Raunkiaer's scheme the resulting spectra show a rather remarkable agreement. Quite as remarkable is their divergence from the normal spectrum especially in the percentage of herbaceous plants. This leads to the conclusion that the normal spectrum is probably in error and that further study will probably lead to its readjustment.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

[Unsigned abstracts are by the editor.]

839. ASHFORD, W. G. The Forest Policy in New South Wales. *Rept. Interstate Conference of Western Australia on Forestry.* Perth, Nov., 1917. P. 22-24.—The fundamental requirements of State Forestry are (1) Stable and expert management; (2) Assured certainty of policy; (3) A fixed system of finance. The 1916 Act granted to New South Wales:—(1) A State forestry board untrammelled by political action. (2) Executive and administrative

powers to establish a settled policy and to maintain continuity. (3) Allocation of 5,000,000 acres of public land as State Forests. (4) Allotment to the Commissioners of 50 per cent of the forestry revenue for re-expenditure on forest works.—A Commission of three is to handle the work of the forests, one of whom is to represent the state proper, one to be a technical forester, and the third to be a business expert. The work will be divided under three heads, that of administration and finance, that of forest management, and that of commercial development. One unified system to result and the handling of the State Forests and of the Crown lands is to be under its control.—Work already under the Commercial Development has resulted in the establishment of two large sawmills, which, in a competitive sale to the Government of 1,250,000 feet of lumber, saved £1,560 to the State over the nearest competitor. The auditor reported that on one year's business, with a turnover of £10,720, a profit of 15 per cent was made after all charges for overhead, interest, depreciation, and profit and loss had been deducted.—*Edw. N. Munns.*

840. GILL, WALTER. The introduction of the remarkable pine (*P. radiata* or *P. insignis*) into South Australia and its successful utilization. Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917, 24-26.—The wood of the planted Monterey pine in South Australia has shown itself adapted to all uses such as the white pine (*P. strobus*) has been used in. Various articles of furniture made 25 years ago of the wood of 10-year old trees are still serviceable. Plantations 24, 26, and 30 years of age show that the annual increment of the trees is 160 cubic feet, or 2000 "superficial feet" per acre, 2769 superficial feet, and 2943 superficial feet per acre respectively. The 26-year old stand had a volume of 72,000 superficial feet per acre, and the 30-year old stand one of 88,308 superficial feet per acre. A sawmill established in a 33-year old plantation cut over 100,000 superficial feet per acre, an annual increment of 3030 feet. The wood is used for boxing and for house construction.—*Edw. N. Munns.*

841. HOWARD, ALBERT. Recent investigations on soil-aeration. Part I. With special reference to agriculture. Indian Forester 44⁵: 187-202. May, 1918. An abridgment is given of the recent work of a number of investigators on the influence of aeration on plant life. This is shown in the rate of growth, the quality of the product produced, and in the distribution of plants.—*Edw. N. Munns.*

842. HOLE, R. S. Recent investigations on soil-aeration. Part II. With special reference to Forestry. Indian Forester 44⁵: 202-212. May, 1918. A study of the factors influencing germination and seedling development of the sal, *Shorea robusta*, revealed that soil-aeration was of primary importance. Soils with poor drainage and in which the amount of CO₂ increased rapidly, caused the death of the small trees. Soil-aeration was found to depend upon the amount of water in the soil, the amount of organic matter present, the number and kind of soil organisms, and the rate at which currents of air, or water with oxygen in solution, penetrate into and percolate through the soil. Ordinary forest operations can control these factors without drainage through the density of shade and amount of organic matter, the use of fire and earth and similar means. The sal root-fungus, *Polyporus shoreae*, is most destructive in badly aerated soils, and limits the sal to the well drained sandy or gravelly lands. Dense growth of grass in a forest may cause the rain water to become heavily charged with CO₂ and influence the rate of growth to a great extent.—*Edw. N. Munns.*

843. JOLLY, N. W. *Araucaria cunninghamii*—The hoop pine. Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. P. 92-94.—A silvical description of the hoop pine in Australia. The distribution, development, and habitat are described and some data on the rate of growth are given. Annual shoots of 10 feet have been recorded for some trees and diameter increments of 1½ inches and over per annum. Reproduction is by both seed and coppice, and, though the latter is strong, it is not vigorous enough to be used in forest management. Natural reproduction must be assisted by suitable soil conditions, an overhead shelter, fire protection, and finally by the later removal of the shelterwood. The enemies of the tree that are of special importance are fire, insect borers, and rodents in the drier localities.—*Edw. N. Munns.*

844. JOLLY, N. W. *Cedrela australis*—The red cedar. Rept. Interstate Conference Forestry. Perth, Nov., 1917. P. 94-95.—The habitat, development and silvical characteristics of the tree are described for this important Australian hardwood. Methods of natural reproduction and management of the tree are described which show that it may be handled either by coppice or by seeding. Natural reproduction by seed is difficult because of the ravages of the cedar twig borer (*Hypsiphyla robusta*). Scrub wallabies, rats, and opossums do considerable damage.—*Edw. N. Munns*.

845. MACOUN, W. T. Winter injury to trees, 1917-18. Canadian For. Jour. 13: 10. Nov., 1918.—The effect of the severe winter of 1917-18 on apple trees is described. Thirteen forms of frost injury are described, the chief form of injury being to trunk or body injuries. The reason ascribed is that the long continued cold weather without thaws caused the trees to lose moisture until they had lost so much that recovery was impossible. Maples, pines, poplars, locusts, oaks, and chestnuts suffered various kinds of injuries. Many exotics were badly injured.—*Edw. N. Munns*.

846. MAIDEN, J. H. The trees of Western Australia. Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. P. 11-17.—This paper is divided into sections on Bibliography, Horticultural value of trees and shrubs, and Eucalypts and minor species.—Under "Bibliography" critical comments of six books on eucalypts are given with lists of some of the important eucalypts of Western Australia. In the second section the value of certain shrubs and trees are described and their cultivation urged.

About 120 species of Western Australia eucalypts are given, the lists being divided into endemic species, those with horticultural value, dry country species, shrubs or small trees not yielding merchantable timber, and tropical trees. Short descriptions of some of the species are given. About 230 species of *Eucalyptus* are now described.—Under minor species it is stated that there are some 500 species of wattles (*Acacia*), most of which are but little known and very poorly represented in the herbaria.—*Edw. N. Munns*.

847. RHOADES, VERNE. Ice storms in the southern Appalachians. Monthly Weather Rev. 46⁸: 373-4. Aug., 1918.—An account of the effect of an ice storm in 1915 upon forest growth in the North Carolina Mountains. Trees of 16 inches and large branches were broken off while many trees were bent to the ground. [See the next entry.]—*Edw. N. Munns*.

848. ASHE, W. W. Note on the preceding. Monthly Weather Rev. 46⁸: 374. Aug., 1918.—A comment on conditions is given, in which characteristics of the forest tree species after severe ice storms are portrayed. The dates of these storms can often be calculated from the crooks in the stem at the point of development of new leaders. [See preceding entry.]—*Edw. N. Munns*.

849. RYAN, G. M. Suggestions to introduce special working plans for the exploitation of *Bassia latifolia* and *Bassia longifolia* in India. Indian Forester 44⁷: 291-315. July, 1918.—The corollas of the *Bassia* trees are of great value as a source of an intoxicating liquor and of food, while the acetone yield is ten times that obtained by the distillation of woods. The acid export for the manufacture of margarine is very large.—The burning of the litter to make the corolla collection easy and to permit the collection of seeds is preventing natural reproduction. Planting for the production of seed and of the corollas is recommended.—*Edw. N. Munns*.

850. SECREST, EDMUND. Meeting the wood fuel situation. Ohio Agric. Exp. Sta. Monthly Bull. 3¹⁰: [whole no. 34.] Oct., 1918.—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel are presented in a popular manner.—*E. R. Hodson*.

851. SECREST, EDMUND. War time uses of timber. Ohio Agric. Exp. Sta. Monthly Bull. 3¹¹ [whole no. 35.] Nov., 1918.—Black walnut for gunstocks and airplane propellers was in

great demand and coöperative methods of handling the sales to make car-load shipments are described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is portrayed. Oaks were used for artillery, motor truck, and ship-building purposes, and the locust for treenails. Care of young growth and the plantation of additional trees are urged.—*E. R. Hodson.*

852. SMYTHIES, E. H. Notes on the dying bark of sal seedlings. *Indian Forester* 44^o: 420-422. Sept., 1918.—A study of one year old seedlings of sal (*Shorea robusta*) shows that under heavy shade the seedlings continue to die back through both the cold weather and the hot weather. A heavy clearance and removal of shade causes those seedlings which would die back to do so immediately, and at the beginning of the following hot weather, many seedlings which had died back in the cleared area start to grow and persist through the hot weather. On shaded areas this effect does not occur.—*Edw. N. Munns.*

853. SUDWORTH, GEORGE B. Miscellaneous conifers of the Rocky Mountain region. U. S. Dept. Agric. Bull. 680. Contrib. from Forest Service. 44 p. 1918.—Nine species found in the Rocky Mountain region are described in this bulletin. These are *Larix laricina*, *L. occidentalis*, *L. lyallii*, *Tsuga heterophylla*, *T. mertensiana*, *Pseudotsuga taxifolia*, *Libocedrus decurrens*, *Thuja plicata*, and *Taxus brevifolia*. The generii characteristics of the genera are given, with a botanical description of the various species, the important silvical characteristics and manner of growth, methods of regeneration and sizes of the trees. Keys for the identification of genera and species are given, with a map of North America on which the geographic distribution of the trees is distinctly portrayed.—*Edw. N. Munns.*

854. SWAINE, J. M. A new forest insect enemy of the white birch. *Canadian For. Jour.* 14^o: 1928-29. Nov., 1918.—In one section of Quebec 50 per cent. of the *Betula alba* were badly diseased and injured by the bronze birch borer, *Agrilus anxius*. The eggs are laid in the bark in June and girdle the tree. Winter is passed in the larval stage, and the adult leaves in June of the following year. For control measures, the cutting of the tree and its utilization in winter is recommended for small areas. Under present conditions it can not be controlled with any great degree of success on large areas. Yellow birch, *Betula lenta*, is not as seriously affected.—*Edw. N. Munns.*

855. WATSON, H. W. A. Forestry in Lower Burma. *Indian Forester*, 44^o: 212-217. May, 1918.—Forest management in the Lower Burma region suffers from the application of the Selective System; the necessity of supplying the plains population with timber; the lack of system or definite end under which the Improvement Fellings are carried out; the uncertainty of the flowering of the Kyathaung bamboo; and the neglect of the "taungya" cutter. Suggestions are given whereby silvicultural methods can be put into effect. The "Uniform System" with regeneration on the French "Quartier bleu" system is indicated.—*Edw. N. Munns.*

856. WHITFORD, H. N. The great timber wealth of South America. *Canadian For. Jour.* 13^o: 1833-34. Aug., 1918.—A short description of the timber conditions and stands in South America, is followed by an estimate of the area in forests. As yet no lumbering has taken place though there is an area of 130 million acres in merchantable forest with a stand of some 650 billion feet.—*E. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

857. ADAMETZ, L. Studien über mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. [Studies on the Mendelian inheritance of the most important racial characters of the Karakul sheep in pure breed-

ing and in crosses with Rambouillets.] [Review by V. Haecker, from Bibl. Genet. 1. 1917.] Zeitschr. f. indukt. Abstamm. u. Vererb. 19: 115-123, Mar., 1918.

858. ALLEN, E. J., AND E. W. SEXTON. The loss of the eye-pigment in *Gammarus chevreuxi*. A Mendelian study. [Abstract from Jour. Marine Biol. Assoc. 11: 273-353. 7 pl. 1917.] Jour. Roy. Microsc. Soc. 1918: 195, June, 1918.

859. ARNY, A. C., AND R. J. GARBER. Variation and correlation in wheat, with special reference to weight of seed planted. Jour. Agric. Res. 14: 359-392, Aug., 1918.—Correlation studies were made on size of seed planted and plants produced in four crops of wheat. Review of literature is given. Various constants for large number of characters are determined and relation of environment to variation discussed. Means show that the various characters responded to growth conditions. Standard deviations for each character were in general largest where means were greatest, due to favorable conditions for development. Some exceptions to this rule were noted. With few exceptions coefficients of variability were higher in 1914 when means were lower.—Authors conclude that "correlation between weight of seed sown and resultant plant characters at maturity, is not high in any instance and may be so modified by environmental conditions that the relation may be slight or obliterated entirely."—Interrelation of plant characters is discussed. It was found that such correlations were modified by environment, depending on characters concerned.—H. H. Love.

860. BAUER, JULIUS. Die konstitutionelle Disposition zu inneren Krankheiten. [The constitutional disposition to internal diseases.] [Review by V. Haecker, from book. 586 p. J. Springer, Berlin, 1917.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 98-109. Mar., 1918.

861. BELL, W. BLAIR. The sex complex. 8vo, xvii 233 p. 50 fig. Ed. Baillière, Tindall & Cox, London, 1916.—Abstract by J. Arthur Thomson in Scientia 24: 62-63. 1918.

862. BLAKESLEE, A. F., AND B. T. AVERY, JR. A vegetative reversion in *Portulaca*. Mem. Brooklyn Bot. Gard. 1: 18. 1918.—Dwarf appeared among plants from commercial seed of *Portulacca grandiflora*. Dwarfs selfed produced only dwarfs, some of which carried reverting branches. These had red instead of green stems and had longer internodes. Flowers on both dwarf stock and reverting branches were red. Selfed seed from reverting branches produced both dwarf with short internodes and normal branches with long internodes, as well as occasional dwarfs that showed reverting branches.—R. J. Garber.

863. BLEULER, E. Mendelismus bei Psychosen, speziell bei der Schizophrenie. Verl. von O. Füssli. [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. 1¹. 1917.] Neurol. Centralbl. 1918: 124. Feb., 1918.

864. BOAS, HELENE M. The relationship between the number of sporophylls and the number of stamens and pistils—a criticism. Bull. Torrey Bot. Club 45: 343-345. Aug., 1918.—Criticism of recent paper by Harris, who found positive correlation between number of sporophylls in flowers of *Ficaria*, and deviation of pistils from number which would occur if ratio of pistils to stamens were constant. He interpreted his results as indicating biological relationship between increase in sporophyll number and tendency toward femaleness. Miss Boas points out that positive correlation is merely mathematical consequence of fact that pistils are as variable in number as stamens, but are less numerous.—Sewall Wright.

865. BROTHERTON, WILBER, JR., AND H. H. BARTLETT. Cell measurement as an aid in the analysis of quantitative variation. Amer. Jour. Bot. 5: 192-206. Apr., 1918.—Variation in length of internodes is correlated with cell number or cell size or both. Influence of light on internode length in *Phaseolus multiflorus* is studied in relation to the length and number of epidermal cells. Growth in darkness results in elongation of internodes to 3.6 times length of normal internodes grown in light, 55 per cent. of increase being found to be due to increased cell division and 45 per cent. to greater extension of cells.—J. P. Kelly.

866. CAPORN, A. ST. CLAIR. The inheritance of tight and loose paleae in *Avena nuda* crosses. Jour. Genetics 7: 229-246. Aug., 1918.—Crosses between oats with tight paleae and *Avena nuda* with loose paleae were made. Three varieties with tight paleae were used, two white and one black-glumed. *Avena nuda* has several flowers in spikelet, other types usually two. Variety of *A. nuda* used showed mixture of gray and white glumes.

The F_1 plants produced heads having some many-flowered spikelets of *nuda* type, occurring nearer tip of head. Spikelets near base of heads were usually two-flowered. Paleae showed all gradations from pure tight to pure loose. Tight paleae occur in greater numbers near base of head, being correlated with few flowers in spikelets. Tight and loose paleae occur in varying relative numbers on F_1 heads.

F_2 and F_3 generations indicated 3:1 ratio with tight paleae recessive. From 119 sowings of F_2 plants 610 pure tights and 1835 not pure tights were obtained. Only 46 pure loose plants were obtained. Not pure tights were grouped into four classes: tight-containers, hard backs, penulti-looses, pure looses, depending on amount and nature of sclerotic tissue surrounding kernels. These various *nuda* types produce different results when tested, (A) throwing tight-containers, hardbacks, penulti-looses, and pure looses; (B) tight-containers, hardbacks, and penulti-looses; (C) tight-containers and hardbacks; (D) hardbacks, penulti-looses, and pure looses; (E) penulti-looses and pure looses. While it seems that tight paleae are represented by a single factor, author suggests following other factors which may operate to cause modifications of the not-tight forms; X, rendering all paleae pure tight; Y, rendering some only of paleae pure tight; Z, rendering some paleae more or less sclerotized but never wholly tight.

Number of flowers per spikelet on tight forms was not increased. Color and loose paleae are inherited independently.—H. H. Love.

867. CAPORN, A. ST. CLAIR. An account of an experiment to determine the heredity of early and late ripening in an oat cross. Jour. Genetics 7: 247-257. Aug., 1918.—Cross between early- and late-maturing oat was studied. Blooming periods of parent forms did not overlap. F_1 types generally intermediate. F_2 gave early, intermediate and late forms. Two of 106 plants were nearly as early as early parent, none so late as late parent. Intermediates ranged from early to late. Author concludes that earliness is possibly a function of three factors. A type which is comparatively early, in that its F_3 period never extends into the period of the late parent, is segregated on a 1:3 basis.—H. H. Love.

868. CAPORN, A. ST. CLAIR. On a case of permanent variation in the glume lengths of extracted parental types and the inheritance of purple colour in the cross *Triticum Polonicum* × *T. Eloboni*. Jour. Genetics 7: 259-280. Aug., 1918.—*Triticum polonicum* having long glumes and colorless kernel, and *Triticum eloboni* having short glumes and purple kernel were crossed. Purple color is in pericarp. F_1 type has glumes intermediate in shape and size between those of parents, grains being purple. In F_2 183 plants were examined and gave some short-, some long-glumed, and a large number of intermediates. Curve of glume length falls into three periods. Similar result is obtained in F_3 from seed of 10 heterozygous F_2 plants. In F_3 170 F_2 plants segregated as follows: 41 short, 87 short, medium and long, and 42 long, indicating that long and short glume follows 1:2:1 ratio.

Kernel color in F_2 showed 28 flushed, 8 streaked and 136 non-colored, indicating 3:1:12 ratio. Color depends some on amount of light as to its development and is brought out by treatment with sulfuric acid. Of 123 non-colored F_2 plants 111 threw non-colored in F_3 , and 12 threw non-colored and streaked. Author believes two kinds of non-colored in F_2 were to each other as 15:1. Results of F_3 were contradictory to F_2 , for in F_3 12 non-colored:1 streaked:3 flushed were obtained, while in F_3 the results were 12 flushed:1 non-colored:3 streaked. Comparisons were made between these results and those obtained by East and Hayes (Inheritance in maize—Conn. Agric. Exp. Sta. Bull. 167, p. 57-104.) Author concludes that "segregations analogous to the F_2 segregation have not been found in the F_3 generation. Streaking, a character which suddenly appeared in the F_2 generation, has resemblances to particolouring in maize."—H. H. Love.

869. CAULLERY, M., AND F. MESNIL. Dimorphisme évolutif chez les Annélides polychètes. Compt. Rend. Soc. Biol. 81: 707-709. July, 1918.—Dimorphism is found in developmental stages. Epitoke females of two sizes, with or without corresponding males, and atoke females with parthenogenetic eggs, exist in one species. Larvae may be pelagic for a time, or develop directly into adult. In *Spio* dimorphism is seasonal, in *Polygordius* geographic. Three species of *Polygordius* may be one species, since only larvae differ. One group is epigamic or epitoke in simple cases, or variously combines schizogamy, blastogenesis, sexual stolons, and viviparity.—A. F. Shull.

870. CRAGG, E., AND H. DRINKWATER. Hereditary absence of phalanges through five generations. [Review by J. F. van Bemmelen, from Jour. Genetics 6. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 95-96. Mar., 1918.

871. CUTHBERTSON, W. "Rogues" among potatoes. Gard. Chron. 64: 102. Sept. 7, 1918.—Writer takes exception to statement by Mr. Jackson that "rogues" should be preserved owing to possibility of new sorts arising by vegetative variation. He states that he has found no important variants during twenty-five years. Color variations, however, have been found, e.g., King Edward gave tubers red in color, the color being maintained when propagated. Northern Star, which has touch of reddish-purple color in eye, gave tuber with eye-color distributed over whole tuber. Color of latter variety also remained constant when propagated. Indisputable evidence of mutation is requested.—H. K. Hayes.

872. DAVENPORT, C. B. Department of experimental evolution. Carnegie Inst. Washington Year Book 16 (1917): 111-132. 1918.—A summary is given of progress by the Station at Cold Spring Harbor during 1917. Metz's studies on chromosome complex of *Drosophila ampelophila* and related species reveals series of twelve types; breeding of *D. virilis* for comparison with *D. ampelophila* has shown degree of mutability in *D. virilis* equal to that in *D. ampelophila*, with mutants of same general types; linkage and crossing over occur as in *D. ampelophila*; five linkage groups already known in *D. virilis* and discovery of sixth is anticipated since this species has six chromosome pairs; two mutants proved as incompatible in reproduction as species in nature. MacDowell found developing male rats subjected to daily doses of alcohol vapor 20 per cent. lighter than normal brothers at end of half a year; imbibition of alcohol reduced fecundity to one-third. MacDowell has published on selection for bristle number in *Drosophila* and Riddle on significance and control of sex in pigeons. Two rare defects of pigeons, ataxia and scraggly plumage, were perpetuated by Riddle to fourth generation; formation of melanin was induced in choroid of albino dove, free oxygen being found necessary. Banta discovered environmental factors induce occurrence of sexual individuals in Cladocera; one strain of *Daphnia* gave origin to a second case of sex-intergrading; most female intergrades with chiefly male secondary characters proved sterile. Blakeslee reported on two yellow-coned variants in *Rudbeckia hirta*, one turning black, other crimson with KOH, which gave purple F₁, with appearance again in F₂ of the two yellows. In *Datura stramonium* he found new mutants; the "Globe" mutant has not been found pure-breeding; previously described form with slit corollas and leaves impressed its characteristics on cions of normal type and abnormality is suspected as bacterial; one mutant found incapable of crossing with original type. In *Portulaca*, Blakeslee reported vegetative segregations and Mendelian nature of doubling, the heterozygous semi-doubles giving full doubles (homozygous), semi-doubles and singles. Harris has secured seven lines of beans yielding only abnormal offspring. He has investigated relation between ovules per pod and fertility, and between number of pods per plant and individual seed-weight in beans. Blakeslee and Harris found a marked inverse correlation between egg-laying ability and yellow ear-lobes in White Leghorns. Davenport's studies on traits of naval men resulted in formation of new criteria for selection of officers; it is asserted that strong inclination toward sea is dependent on recessive factor.—J. P. Kelly.

873. DAVENPORT, C. B. The feebly inhibited. 8vo, 158 p. 86 fig. Carnegie Inst., Washington, Washington, D. C., 1915.—Abstract by Y. Le Lay in Scientia 24: 64. 1918.

874. DAWSON, E. RUMLEY. The causation of sex in man. 2nd ed. 8vo, xiv 226 p. 21 fig. Lewis & Co.: London, 1917.—Abstract by J. Arthur Thompson in *Scientia* 24: 61-62. 1918.

875. DRINKWATER, H. A second brachydactylous family. [Review by H. W. Siemens, from *Jour. Genetics* 4: 323. pl. XI-XV, fig. 3. 1914-1915.] *Zeitschr. indukt. Abstamm. u. Vererb.* 19: 96. Mar., 1918.

876. EAST, E. M. Intercrosses between self-sterile plants. *Mem. Brooklyn Bot. Gard.* 1: 141-153. July, 1918.—Data are reported concerning the cross-sterility and cross-fertility of 53 F_1 hybrids from *Nicotiana Forgetiana* and *Nicotiana glauca*, two species in which self-incompatibility in fertilization appears to be strongly developed. In all, 103 reciprocal matings were made from which it was found that the population fell into classes. Each member of a class was cross-sterile with every other member, but was cross-fertile with every member of other classes. Three classes were well defined with 22, 16 and 12 individuals, respectively; two classes contained but one individual each; presence of a fifth class was suggested by behavior of a single plant.

These results are explained in terms of Mendelian factors assumed to be directly concerned with compatibility. Author adheres to doctrine, often announced previously, that incompatibility in such cases is due to "similarity" of constitution and that compatibility is due to "dissimilarity" of constitution. It is recognized however, as has frequently been pointed out for similar cases, that pollen grains of a plant appear to act quite alike independently of any segregation of hereditary factors in reduction divisions concerned with their formation. It is stated that reciprocal crosses always gave same results and that self-fertilization in these plants increases cross-incompatibility among plants of subsequent generations.

It is reported that self-sterility (and cross-sterility as well) of a plant may decline toward end of flowering period, to such degree that plant may become self-fertile, a condition which is called "end-season pseudo-fertility."

All data presented in this paper are given in same detail, together with other data and with more extended discussion, in another paper which precedes as to date of publication (*Genetics* 2: 505-609. Nov., 1917).—A. B. Stout.

877. EMERSON, R. A. A fifth pair of factors, *Aa*, for aleurone color in maize, and its relation to the *Cc* and *Rr* pairs. *Mem. Cornell Univ. Agric. Exp. Sta.* 16. 23 × 16 cm., 231-289 p. Cornell Univ., Ithaca, N. Y., Nov., 1918.—A pair of factors, *Aa*, such that aleurone color develops only in the presence of *A* in addition to *C*, *R* and *i*, is announced to account for 27:37 F_2 ratios of colored to colorless aleurone. Hypothesis regarded as substantiated by following tests: (1) Colored F_2 's shown to be of four classes resulting in F_3 ratios of 1:0, 3:1, 9:7 and 27:37 in approximately the relation of 1:6:12:8, respectively, and (2) colorless F_2 's bred true in F_3 and shown to consist of the seven classes, *aCR*, *AcR*, *ACr*, *acr*, *acR* and *acr*. Use of *aCR*, *AcR*, and *ACr* in testing for aleurone-color factors is explained and illustrated. Effect on aleurone color of degree of maturity and of color, composition and texture of underlying endosperm is discussed and influence of previously unannounced genetic factors noted. Heterozygous mottlings of aleurone is due to *Rr* pair and seen only when *R* is contributed by male and *r* by female, resulting aleurone *rrR*, self color appearing in reciprocal cross, aleurone *RRr*. Various hypotheses are noted as possible interpretations. Anomalously colored seeds, part colored and part colorless, are rarely if ever due to *Rr* pair, but frequently to *Cc* or *Aa* pairs and then only when dominant factor is contributed by male and recessive by female. Hypotheses involving vegetative segregation, somatic mutation and aberrant chromosome behavior discussed as possible interpretations.—R. A. Emerson.

878. FISCHER, E. Zur Frage der Vererbung der Empfänglichkeit von Pflanzen für parasitische Pilze. [On the question of inheritance of the susceptibility of plants to parasitic fungi.] [Review by E. Schiemann, from *Mitt. Nat. Ges. Bern* für 1916, *Mykol. Beitr.* 8: 144-156. 1916.] *Zeitschr. indukt. Abstamm. u. Vererb.* 19: 136-138. Mar., 1918.

879. FLEISCHER, BRUNO. Über myotonische Dystrophie. [Abstract by Kurt Mendel, from Münchener med. Wochenschr. 1917.] Neurol. Centralbl. 1918: 126, Feb., 1918.

880. GÖBEL, RUDOLF, AND WERNER RUNGI. Eine familiäre Trophoneurose der unteren Extremitäten. [Abstract by Kurt Mendel, from Archiv f. Psych. 57: 1917.] Neurol. Centralbl. 1918: 121. Feb., 1918.

881. GOODALE, H. D. Internal factors influencing egg production in the Rhode Island Red breed of domestic fowl. Amer. Nat. 52: 65-94, 209-232, 301-321. 17 fig. Feb.-Mar., Apr.-May, June-July, 1918.—Starting with the assumption that the egg-record of a hen "expressed as a given number of eggs per unit of time, and taken by itself, is not a sufficient measure or description of egg production, even under favorable environment," author proceeds to inquire regarding influence or interaction of number of external and of innate factors, such as rate of growth, bodily maturity, stamina, cessation of growth, sexual maturity, age at first egg, cycles, molt, rate and rhythm of production, and Pearl's genetic factors L_1 and L_2 . In turn each of these factors is analyzed and discussed. Conclusions, based upon four years' study of production in Rhode Island Red breed, may be summarized as follows: (1) Date of first egg depends on time of hatching and rate of growth. On average, hens laying early in fall lay more winter eggs than those that begin later. (2) On average, pullets that lay early in life (6 to 7 months) lay more eggs than those that lay at 8 or 9 months. Variability in age at first egg was greater for Goodale's than for Pearl's stock. (3) Birds that lay rapidly lay more eggs than birds that lay slowly; and birds that lay late in fall lay more than those that stop early. (4) Some pullets lay continuously for long periods while others lay rapidly, but in cycles with period of rest between. In Goodale's Reds a "winter cycle," comparable to that found by Pearl in Barred Rocks, was absent "in a large percentage" of hens. Curves of winter production are shown to be compound curves. (5) Small birds mature earlier than large ones and therefore usually lay more winter eggs. Birds of poor stamina however, though sometimes making good records, usually manifest delay in appearance of first egg and hence give lower winter records. (6) Author regards fecundity as unsatisfactory character upon which to study effects of selection because character is complex and not simple unit character. Genetic constitution of Goodale's stock, with reference to Pearl's fecundity factors (L_1 and L_2) was not made out with certainty, but author believes that his Reds fall into Pearl's class of high producers. (7) Concludes by saying that knowledge of factors determining production is of importance from both commercial and biological standpoint. Biologically problem must be attacked from viewpoint that fecundity in fowls is not simple character but extremely complex.—P. B. Hadley.

882. GREGORY, R. P. On variegation in *Primula sinensis*. [Abstract by E. Lehmann, from Jour. Genetics 4: 305-322. 1915.] Zeitschr. Bot. 10: 133-137. 1918.

883. HAECKER, VALENTIN. Über Gedächtnis, Vererbung und Pluripotenz. [On memory, heredity and pluripotency.] [Review by Georg Sommer. In Zeitschr. induct. Abstamm. u. Vererb. 19: 91-94. Mar., 1918.] 97 p. 14 fig. G. Fischer: Jena. 1914.

884. HARRIS, J. ARTHUR. Further studies on the inter-relationship of morphological and physiological characters in seedlings of *Phaseolus*. Mem. Brooklyn Bot. Gard. 1: 167-174. July 6, 1918.—Seedlings of navy bean, morphologically aberrant in having cotyledons vertically separated, are compared with normal seedlings in respect to (a) mean green weight, (b) mean dry weight and (c) percentage of dry matter present in primordial and first compound leaves. Normal and abnormal seedlings were grown in pairs under rigid control and samples of leaves were taken from plants in lots of 100. Data are given for 23 (4,600 plants) such samples. Values show clearly that "abnormal plants produce relatively as well as absolutely less dry matter than normals." Morphological variation is associated with physiological differentiation.—A. B. Stout.

885. HARRIS, J. A. Further studies on the relationship between bilateral asymmetry and fertility and fecundity in the unilocular fruit. [Abstract by Cyril West, from Genetics 2:

186-204. 1917.] *Physiol. Abst.* 3:355. Sept., 1918. See also *Exp. Sta. Rec.* 38: 29. Jan., 1918.

886. HARRIS, J. A. Supplementary determinations of the relationship between the number of ovules per pod and fertility in *Phaseolus*. [Abstract by Cyril West, from *Genetics* 2: 282-290. 1917.] *Physiol. Abst.* 3: 355. Sept., 1918. See also *Exp. Sta. Rec.* 38: 29. Jan., 1918.

887. HARRIS, J. A. On the applicability of Pearson's biserial r to the problem of asymmetry and fertility in the unilocular fruit. [Abstract by Cyril West, from *Genetics* 2: 205-212. 1917.] *Physiol. Abst.* 3: 355. Sept., 1918. See also *Exp. Sta. Rec.* 38: 29. Jan., 1918.

888. HARRISON, J. W. H. Studies in the hybrid *Bistoninae*. [Abstract by J. F. van Bemmelen, from *Jour. Genetics* 6: 95-161. 4 pl. 1916.] *Zeitschr. induct. Abstamm. u. Vererb.* 19: 124-125. Mar., 1918.

889. HAYES, H. K. Natural cross-pollination in wheat. *Jour. Amer. Soc. Agron.* 10: 120-122. 1918.—Three out of fifty pedigree cultures of wheat supposed to be pure lines, but which had been exposed to natural crossing, showed hybridity by Mendelian segregation. Further observation revealed other evident cases, all of which leads to conclusion that either conditions were unusually favorable for natural crossing or else this occurs much more frequently than has been generally supposed to be the case.—*L. H. Smith.*

890. HAYES, H. K. Normal self-fertilization in corn. *Jour. Amer. Soc. Agron.* 10: 123-126. 1918.—Describes experiment in which yield of corn was reduced more than 50 per cent. first year following self-fertilization. Experiment to determine amount of self-fertilization occurring under normal field conditions, by interplanting varieties of different-colored kernels, indicated less than 5 per cent. self-pollination.—*L. H. Smith.*

891. HAYWARD, P. S. A new hybrid lily. *Gard. Chron.* 64: 107-108, 148. 1918.—A new hybrid between the *auratum* and *speciosum* groups of lilies, superseding *L. Parkmannii* in point of interest on account of the rareness of this cross. New hybrid differs from *L. Parkmannii* in "form, petal and colouring."—*M. J. Dorsey.*

892. HEILIG, M. Über Beziehungen zwischen klinischem und histopathologischem Befund bei einer familiären Erkrankung des kindlichen motorischen Systems. [Abstract by Kurt Mendel, from *Arch. f. Psych.* 57². 1917.] *Neurol. Centralbl.* 1918: 119. Feb., 1918.

893. HENKEMEYER, A. Untersuchungen über die Spaltungen von Weizenbastarden in der F_2 und F_3 Generation. [Investigations on the splitting of wheat hybrids in F_2 and F_3 generations.] [Review by G. v. Übisch, from *Diss. Göttingen.* 8vo, 32 p. 1915.] *Zeitschr. induct. Abstamm. u. Vererb.* 19: 139-140. Mar., 1918.

894. HERIBERT-NILSSON, N. Eine Mendelsche Erklärung der Verlustmutanten. [A Mendelian explanation of loss mutations.] [Review by E. Baur, from *Ber. Deutsch. Bot. Ges.* 34: 870. 1917.] *Zeitschr. induct. Abstamm. u. Vererb.* 19: 90-91. Mar., 1918.

895. HEYMANN, ADOLF. Zur Lehre von der partiellen Myotonia congenita. [Abstract by Kurt Boas, from *Inaug.-Dissert.* Kiel, 1917.] *Neurol. Centralbl.* 1918: 125. Feb., 1918.

896. HIGIER, H. Eine seltene Form von Epilepsie bei drei Brüdern (Epilepsie myoclonica Unterricht-Lundborg-J. 'Author's abstract from *Ber. d. Warschauer ärztl. Ges.* 112. 1916.] *Neurol. Centralbl.* 1918: 120. Feb., 1918.

897. HÜBNER, A. H. Über Myotonie. [Abstract by Kurt Mendel, from *Deutsche Zeitschr. f. Nervenheilk.* 57³⁻⁵. 1917.] *Neurol. Centralbl.* 1918: 125. Feb., 1918.

898. HUMBERT, E. P. A striking variation in *Silene noctiflora*. Bull. Torrey Bot. Club 45: 157-158. Apr., 1918.—Describes seedlings with 3 cotyledons and with divided cotyledons.—J. A. Harris.

899. IKENO, S. Studies on the hybrids of *Capsicum annuum*. Part II. On some variegated races. [Abstract by E. Lehmann, from Jour. Genetics 6: 201-230. 1916.] Zeitschr. Bot. 10: 133-137. 1918. See also Exp. Sta. Rec. 39: 123. Aug., 1918.

900. IKENO, S. A note to my paper on some variegated races of *Capsicum annuum*. [Abstract by E. Lehmann, from Jour. Genetics 6: 315-316. 1916.] Zeitschr. Bot. 10: 133-137. 1918.

901. ISHIKAWA, MITSUHARA. A list of the number of chromosomes. [Review by G. Tischler, from Tokyo Bot. Mag. 30: 404-448. 32 fig. 1916.] Zeitschr. induct. Abstamm. u. Vererb. 19: 125-126. Mar., 1918.

902. JEFFREY, E. C. Hybridism and the rate of evolution in angiosperms. [Review by E. Baur, from Amer. Nat. 50: 129-143. 1916.] Zeitschr. induct. Abstamm. u. Vererb. 19: 134. Mar., 1918.

903. JONES, L. R. Disease resistance in cabbage. Proc. Nation. Acad. Sci. 4: 42-46. 1918.—Most destructive disease of cabbage is "yellows," caused by soil-inhabiting fungus (*Fusarium conglutiniosus*) which invades root system. It may persist indefinitely in soil which is called "cabbage sick."—Investigation of disease and its control was begun in Wisconsin in 1910. In most diseased fields some normally developed plants were found. Some were of best commercial type and fifty resistant plants were selected. Seed was grown and in 1912 each head strain was planted separately on "sick" soil. Commercial strains were planted as controls.—Poorest of selected strains proved decidedly superior to best of controls. Seed was grown from best of selected strains and planted in 1914. Best selected strain yielded 18.8 tons per acre against 2.1 tons for average of controls.—This strain has been distributed under name "Wisconsin Hollander."—The behavior of the organism causing disease was worked out by W. H. Tisdale by using flax wilt as basis, since cabbage is slow-growing plant to work with. Secondary studies with cabbage, while not complete, indicate general likeness in behavior.—In susceptible plant the organism penetrates directly to vessels and then ramifies through them. In resistant plants invasion is much slower and before it reaches vessels corky layer is formed which permanently walls off organism.—Crossing highly susceptible with resistant strains show resistance has tendency to be dominant. Indications are that it is dependent on several heritable factors.

J. C. Gilman found "critical soil temperature" for invasion of plant to be 17°C. Below this plants are not attacked even in sickest soils while for some 10°C. above this, attack becomes progressively more virulent.—In field trials strains resistant in Wisconsin have proved similarly resistant from New Jersey to Iowa. Investigations with other varieties at Wisconsin and also in Ohio, Iowa and Maryland have given encouraging results and indicate resistant strains can be secured from any vigorous variety. [See Bot. Absts. 1, Entry 321. Also see Physiol. Absts., 3: 305. July-Aug., 1918.]—Karl Kurtzweil.

904. KEARNEY, THOMAS H., AND WALTON G. WELLS. A study of hybrids in Egyptian cotton. Amer. Nat. 52: 491-506. 3 fig. Oct.-Nov., 1918.—Preliminary study of crosses between varieties belonging to same general type of *Gossypium*. Less variable Puna and more variable Gila (differ chiefly in size and shape characters) gave practically no dominant in F_1 and unimodal distributions in F_2 . Back-crossing F_1 twice with either parent obliterated expression of character of other parent.—Characters not correlated physically or physiologically are transmitted independently. F_2 and F_3 were not more variable than Gila and but slightly more variable than Puna.—R. J. Garber.

905. KIESSLING, L. Untersuchungen über die Vererbung von Stickstoffgehalt und Korngrösse der Zweizeiligen nickenden Gerste. [Investigations on the inheritance of nitrogen con-

tent and size of grain in two-rowed nodding barley.] [Review by E. Schiemann, from Zeitschr. Pflanzenzüchtung 3: 81-147. Sept., 1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 141. Mar., 1918.

906. KIESSLING, L. Über die Streifenkrankheit der Gerste als Sorten und Linienkrankheit. [On the striping-disease of barley as a varietal and racial disease.] [Review by E. Schiemann from Fühlings Landw. Ztg. 65: 537-549. Sept., 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 141-142. Mar., 1918.

907. KING, HELEN DEAN. Studies on inbreeding. III. The effects of inbreeding with selection, on the sex ratio of the albino rat. Jour. Exp. Zool. 27: 1-35. 1 fig. Oct., 1918.—Selection of breeding females from litters containing excess of males increased sex ratio (number of males per 100 females) from norm of 105 to 122.3 when females were mated to litter brothers, and to 115.6 when females were mated to unrelated males. Selection of breeding females from litters containing excess of females reduced sex ratio to 81.8 when females were mated to litter brothers, and to 91.1 when females were mated to stock males. Effect of selection reaches its maximum in first generation, and was not cumulative. Mating stock females to males from series selected for high and low sex ratio resulted in both cases in a reduced sex ratio, but the reduction was greater when males came from series selected for low sex ratio. In either case reduction was small, to 102.3 and 96.2 respectively, and may not be significant. Alteration of sex ratio is thus most easily affected by selection of females. Inbreeding did not of itself change the sex ratio to any extent. Author believes selection affects egg metabolism in such way as to render eggs more easily fertilized by male- or female-producing spermatozoa.—A. F. Shull.

908. KOCH, CARL. Ein Fall einer Kombination von progressiver Muskelatrophie mit Myotonie. [Abstract by Kurt Mendel, from Ber. aus d. Abt. f. Kriegsneur. d. k. k. Reservespitales Nr. 3 in Laibach. Sept., 1917.] Neurol. Centralbl. 1918: 126. Feb., 1918.

909. KOOY, F. H. Über einen Fall von Heredodegeneratio, Typus Strümpell, bei Zwillingen. [Abstract by Kurt Mendel, from Deutsche Zeitschr. Nervenheilk. 57³⁻⁵. 1917.] Neurol. Centralbl. 1918: 122. Feb., 1918.

910. KRETSCHMER, ERNST. Über eine familiäre Blutdrüsenerkrankung. (Abstract by Kurt Mendel, from Zeitschr. Ges. Neurol. u. Psych. 36¹⁻². 1917.) Neurol. Centralbl. 1918: 118. Feb., 1918.

911. LA MARCA, F. Un nouvel hybride de greffe. [A new graft-hybrid.] Compt. rend. Paris, 166: 647-649. 1918.—Describes graft hybrids appearing on 40-year old olive trees located in Caserta province, Italy. Graft belonged to variety Cannellina which produces ivory-white fruit at maturity while stock belonged to the variety Caiazzana which produces black fruit. Three of grafted trees bore both ivory-colored and black fruit. On one tree black fruit appeared at summit and at periphery, on second tree at end of sprout which grew perpendicularly from extremity of old branch, while third was from one of three boughs growing from same point.

Great diversity of coloration convinced observer that asexual hybridization was cause, and suspected hybrid was compared with varieties of Cannellina and Caiazzana. Comparison of stones, relation of equatorial and longitudinal breadth of same, leaf shape, peduncle of drupes, as well as analyses of oil showed hybrid to be different from parental varieties used for stock and graft. For many of these characters the suspected graft hybrid was intermediate.—Same phenomenon verified for four successive seasons convinced author that "asexual hybridization" actually was the cause. [See Physiol. Absts. 3: 293. July-Aug., 1918. Also, Jour. Roy. Microsc. Soc. 1918: 318. Sept. 1918. Also, Exp. Sta. Rec. 39: 447. Oct., 1918.]—H. K. Hayes.

912. LOEB, J. Further experiments on the sex of parthenogenetic frogs. Proc. Nation. Acad. Sci. 4: 60-62. 1918.—Twenty normal frogs of full size have been raised from artificially

parthenogenetic eggs, development being induced by method of puncture. Nine are still alive. Sex of nine others has been ascertained at age of 10 to 18 months, seven being males, two females. One male was examined cytologically, found to have diploid number of chromosomes. Possibilities for chromosome number in female are discussed. [Abstract by W. D. Halliburton in *Physiol. Abst.* 3: 328. Sept., 1918. See also *Jour. Roy. Microsc. Soc.* 1918: 290. Sept., 1918.]—A. F. Shull.

913. LONGMAN, H. A. AND C. T. WHITE. Mutation in a proteaceous tree. *Proc. Roy. Soc. Queensland* 30: 162-165. *Fig. 22.* Oct. 11, 1918.—In *Buckinghamia celsissima* normal flower has at base of pistil a crenulate gland. Several hundred flowers from specimen in Brisbane Botanical Garden showed this gland cut into 4 or 5 segments in nearly all, with 2 of these segments elongated into noticeable style-like processes that had no enlargement basally. Investigation revealed that seed parent of this specimen had same pair of processes in its flowers. Other trees were found that showed small percentage of such exceptional flowers.—James P. Kelly.

914. LOVE, H. H., AND W. T. CRAIG. The relation between color and other characters in certain *Avena* crosses. *Amer. Nat.* 52: 369-383. Aug.-Sept., 1918.—Results of several years' study of cross *Avena fatua* X *Avena sativa* var. Sixty Day, which closely resemble forms used by Surface. *Avena fatua* is brown or black, with both grains of spikelets awned and pubescent and has typical wild type of base, surrounded by tuft of basal hairs. Sixty Day is yellow, seldom awned and has no dorsal hairs, but may have an occasional basal hair. Parent and F_1 plants were grown in greenhouse, later generations in field. F_1 was generally intermediate-color, lighter brown than wild type, large grain of spikelet often awned and covered with dorsal hairs, small grain of spikelet never awned but with occasional dorsal hairs, base more like *sativa*, yet intermediate with some basal hairs at either side but not at back. F_2 gave several types, some resembling P_1 , also other types different in color, amount of awning, pubescence, and the like. Color types were black, gray and yellow. The black oats were all more or less pubescent and the grays either pubescent or smooth. Both blacks and grays were awned, partially awned, or awnless. But the yellow oats were all smooth and entirely or nearly awnless, none possessing strong awns of wild type and none having more than 30 per cent. of awns, whereas blacks and grays were distributed throughout entire range from awnless to fully awned. This indicates some relation between yellow color and lack of awns.—Similar but less definite evidence of apparent inhibition of awning produced by yellow color was discussed by Nilsson-Ehle.—Assuming that *fatua* carries genes for black gray and yellow, segregation of 12 black: 3 gray: 1 yellow would be expected. Proportion of blacks to non-blacks was fairly close to 3: 1, but difficulty of distinguishing pale grays from yellows caused considerable deviation in gray and yellow classes. It is very significant that there are no smooth blacks. The grays segregated as to pubescence on what may be a 1: 2: 1 ratio. No pubescent yellows have been obtained. Apparently there are two factors for pubescence, one linked with black, the other independent of any color factor.—In type of base the sucker-mouth shape of *sativa* is dominant or partially so to wild type, giving in this and other crosses 3: 1 ratio, except in yellow oats which are all of *sativa* class. Thus some factor or factors related to yellow color inhibit production of wild type of base.—Data from three F_3 families exhibiting segregation similar to that obtained in F_2 substantiate inferences drawn from F_2 data, segregation as to color being clearly 12 black: 3 gray: 1 yellow. Segregation as regards pubescence and type of base agrees closely with that of F_2 .—Three other F_3 families came from F_2 plants which were black, pubescent on one grain, and nearly awnless. Combined data gave classes, 231 black with one grain pubescent: 88 yellow smooth. This further substantiates statement that a pubescence factor is linked with black color factor.—In general there is very definite relation between color of glumes and production of awns. Form of *fatua* used here had two factors for pubescence, while in cross between *Avena fatua* and *Avena sativa* var. Tartar King, there were two types of *fatua* involved, one giving 15: 1 ratio, other, 3: 1 ratio. Latter type of *fatua* crossed with Sixty Day produced only smooth non-blacks, showing that this form has pubescence factor closely linked with black color gene.—Assuming *Avena fatua*

to be represented by *BGGYYPP*, where *B* is factor for black; *G*, for gray; *Y*, for yellow; *P*, for pubescence; formula for Sixty Day becomes *bbggYYpp*; and *Y* inhibits pubescence in absence of *B* or *G*. This is the most reasonable explanation in view of data from other crosses. Facts in F_2 and F_3 tend to substantiate this hypothesis. In addition there is good evidence for existence of distinct strains within same variety of oats. Inhibiting effect of yellow on awns, pubescence and base, is not general for yellow oats.—*E. B. Babcock*.

915. McQUEEN, E. N. The distribution of attention. 8vo, 142 p. University Press, Cambridge, England, 1917. [Abstract by Y. Le Lay.] *Scientia* 24: 64-65. 1918.

916. MEADE, ROWLAND M. Bee keeping may increase the cotton crop. *Jour. Heredity* 9: 282-285. fig. 16-17. Oct., 1918.—Percentage of cotton flowers developing mature bolls is generally low. This is found to be case even in California, where boll weevil is absent and water is furnished by irrigation. There is good reason for supposing that lack of fertilization is important factor in this connection. Certain forms in which pistils are short, usually become self-pollinated; but flowers with long pistils are dependent on insects, at least to great extent. Experiments were made at San Antonio, Texas, in which plants were artificially pollinated. Percentage of bolls produced was materially increased. It is therefore suggested that bee-keeping in vicinity of cotton-fields, especially when cotton is of long-stapled type with long-exserted pistils, may be distinctly advantageous. Pollen of cotton is of such nature that it is not carried by wind.—*T. D. A. Cockerell*.

917. MILES, FRANK C. A genetic and cytological study of certain types of albinism in maize. [Review by Tine Tamames, from *Jour. Genetics* 4: 193. 1914-1915.] *Zeitschr. induct. Abstamm. u. Vererb.* 19: 142-143. Mar., 1918.

918. MILES, FRANK C. A genetic and cytological study of certain types of albinism in maize. [Abstract by E. Lehmann, from *Jour. Genetics* 4: 193-214. 1915.] *Zeitschr. Bot.* 10: 133-137. 1918.

919. NAEGLI, ÜBER Myotonia atrophica. [Abstract by Kurt Mendel, from *Münchener med. Wochenschr.* 1917⁵¹.] *Neurol. Centralbl.* 1918: 126. Feb., 1918.

920. NAVILLE, F. L'idiotie amaurotique familiale de Tay-Sachs. [Abstract by Kurt Mendel, from *Schweizer Arch. f. Neurol. u. Psych.* 1¹. 1917.] *Neurol. Centralbl.* 1918: 122. Feb., 1918.

921. NAVILLE, F. Étude anatomique du névraxe dans un cas d'idiotie familiale amaurotique de Sachs. [Abstract by Kurt Mendel, from *Schweizer Arch. f. Neurol. u. Psych.* 1¹. 1917.] *Neurol. Centralbl.* 1918: 123. Feb., 1918.

922. NILSSON-EHLE, H. Gibt es erbliche Weizenrassen mit mehr oder weniger vollständiger Selbstbefruchtung? [Are there hereditary races of wheat with more or less complete self-fertilization?] [Review by E. Schiemann, from *Zeitschr. f. Pflanzenzüchtung* 3: 1-6. Sept., 1918.] *Zeitschr. f. induct. Abstamm. u. Vererb.* 19: 140-141. Mar., 1918.

923. ORTLEPP, KARL. Monographie der Füllungserscheinungen bei Tulpenblüten. [Monograph of the phenomena of doubling in tulip blossoms.] [Review by E. Lehmann, of book. Leipzig, 1915.] *Zeitschr. induct. Abstamm. u. Vererb.* 19: 143-144. Mar., 1918.

924. PELTIER, GEO. L. Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus *Citrus*. *Jour. Agric. Res.* 14: 337-358. Aug., 1918.—Author attempts to determine susceptibility and resistance to citrus-canker (caused by *Pseudomonas citri* Hasse) of wild relative of citrus and certain more obscure species, varieties and hybrids. Methods of inoculation on young vigorous plants were carefully controlled and all forms subsequent to inoculation were grown at relatively high temperatures in cases in the greenhouse where practically 100 per cent. humidity was maintained. Relative sus-

ceptibility of different forms under experiment was judged according to number, size, and character of leaf spots. Material was made available by the United States Department of Agriculture.

The inoculation tests show that the "Citrus-canker" is apparently limited to those plants having edible fruits with stalked pulp vesicles of the subtribe Citrinae which includes the genera, Poncirus, Fortunella, Eremocitrus, Citrus, and Mirocitrus. Of citrus relatives, Fortunella, Eremocitrus, and Mirocitrus show some resistance to this canker while Poncirus is extremely susceptible. All species and varieties of citrus tested are susceptible, although some forms as the varieties of *C. nobilis*, the Kansas orange and "possibly" *C. milis* showed some resistance.

From genetic standpoint, relative susceptibility of certain hybrids is important. When both parents are susceptible the hybrid shows some susceptibility. When one parent is resistant hybrid "retains to a large extent" resistance of resistant parent. Hybrids between two resistant parents were not available for test.—*M. J. Dorsey.*

925. PUNNETT, R. C. Studies in cereal-breeding. Gard. Chron. 64: 180. Oct. 12, 1918.—Abstract of three papers on oat and wheat crosses by A. St. C. Caporn., in Journal of Genetics, August, 1918. [See Bot. Absts. 1, Entries 866, 867, 868.]

926. PUNNETT, R. C. Reduplication series in sweet peas. [Review by Tine Tammes, from Jour. Genetics 3: 77. 1913-1914.] Zeitschr. induct. Abstamm. u. Vererb. 19: 143. Mar., 1918.

927. RABAUD, ETIENNE. "Dislocated" mice. [Abstract from Bull. Soc. Zool. France, 42: 87-97. 1 fig. 1917.] Jour. Roy. Microsc. Soc. 1918: 33. Mar., 1918.

928. ROBERTS, ELMER. Fluctuations in a recessive Mendelian character and selection. Jour. Exp. Zool. 27: 157-192. 2 pl., 3 fig. Nov. 20, 1918.—Thirty-four generations of selection for length of wing effected no recognizable change in a strain of *Drosophila* with vestigial wings. After crossing with normal wild stock, significant increase in size of wings was found among vestigial segregates. Increase was greater in males than in females. Thirty-two generations of selection produced no further change. Much of variation was found to be due to temperature, males being more easily affected than females.—*Sewall Wright.*

929. ROSENBERG, O. Die Reduktionsteilung und ihre Degeneration in Hieracium. [Reduction division and its degeneration in Hieracium.] [Review by G. Tischler, from Svensk. bot. Tidskr. 11: 145-206. 26 fig. 1917.] Zeitschr. induct. Abstamm. u. Vererb. 19: 130-132. Mar., 1918.

930. SAHLI, G. Die Empfänglichkeit von Pomaceenbastarden, Chimären und intermediären Formen für Gymnosporangien. [Susceptibility of Pomaceous hybrids, chimaeras, and intermediate forms to Gymnosporangia.] [Review by E. Schiemann, from Centralbl. Bakt. II, 45: 264-301. 1916.] Zeitschr. induct. Abstamm. u. Vererb. 19: 136-138. Mar., 1918.

931. SCHAXEL, J. Über den Mechanismus der Vererbung. [On the mechanism of heredity.] Review by M. Gerschler, of book. Fischer, Jena. 1916.] Zeitschr. induct. Abstamm. u. Vererb. 19: 89-90. Mar., 1918.

932. SHULL, A. FRANKLIN. Relative effectiveness of food, oxygen, and other substances in causing or preventing male-production in Hydatina. Jour. Exp. Zool. 26: 521-544. Aug., 1918.—Experiments with rotifers to test effect of saturation of culture water with air-oxygen mixtures, of which 40 or 60 per cent. was oxygen, upon ratio of male-producing females to female-producing females. (1) Six lots of rotifers subjected to 60 per cent. oxygen mixture were exposed to ordinary air conditions as control. Control showed total average of about 14 per cent. male-producing females while those treated with oxygen yielded an average of about 26 per cent. male-producing females. (2) 14 lots in air mixture yielded about 19 per

cent. male-producing females while in 60 per cent. oxygen mixture 11 lots yielded about 21 per cent. male-producing females and 3 lots yielded 54 per cent., thus averaging about 27 per cent. male-producing females. (3) 14 lots under air conditions yielded about 13 per cent. male-producing females, while 11 lots in 40 per cent. oxygen mixture yielded only about 6 per cent. but 3 lots yielded about 69 per cent. male-producing females, thus making total average of about 21 per cent. male-producing females, or about 8 per cent. higher than control. Higher total average of male-producing females in oxygenated lots seems to indicate that oxygen is potent factor in production of male-producing females. (5) Many tests to determine amount of oxygen in culture waters that were subjected to air, 40 per cent. and 60 per cent. of oxygen atmosphere, at beginning and at end of experiments, showed that those subjected to oxygen atmosphere always contained more oxygen than similar ones not subjected to oxygen. Manure scum decreased amount of oxygen in various culture waters while *Euglena* increased it. (6) Certain lots of rotifers were fed *Euglena* in non-oxygenated water, certain lots manure scum in oxygenated water, and other lots manure scum in non-oxygenated water, in order to determine influence of these agents in causing production of male-producing females. 20 lots fed *Euglena* yielded about 14 per cent. male-producing females. 20 lots fed manure scum yielded about 5 per cent. male-producing females. 18 lots fed manure scum in oxygenated water yielded only about 4 per cent.; while 2 other similarly treated lots yielded about 32 per cent. male-producing females, thus making total average of about 8 per cent.; which is about 3 per cent. of male-producing females higher than in preceding lots that received no oxygen treatment. Author concludes that *Euglena* increases male-producing female production about 9 per cent. above that of manure scum and that oxygen in manure scum increases male-producing female production about 3 per cent. above that in manure scum without oxygen treatment. Furthermore general conclusion is reached from this experiment that food is about twice as effective as oxygen in causing male-producing females to be produced. (7) *Euglena* in spring water yielded maximum percentage of male-producing females, while manure scum in manure solution yielded minimum percentage of male-producing females. (8) In two experiments with creatin, *Euglena*, manure scum, and spring water one experiment showed that effect of *Euglena* as food was nearly 17 times as effective as oxygen and other experiment only about 3 times as effective as oxygen, in increasing male-producing females. General conclusion of whole paper is that oxygen and food are factors which increase number of male-producing females but that food is several times as effective as oxygen in causing this increase.—D. D. Whitney.

933. SHULL, A. FRANKLIN, AND SONIA LADOFF. Factors affecting male-production in *Hydatina*. [Abstract by M. Gerschler, from Jour. Exp. Zool. 21. 1916.] Zeitschr. induct. Abstamm. u. Vererb. 19: 110-115. Mar., 1918.

934. SHULL, A. FRANKLIN. Periodicity in the production of males in *Hydatina senta*. [Abstract by M. Gerschler, from Biol. Bull. 28. 1915.] Zeitschr. induct. Abstamm. u. Vererb. 19: 110. Mar., 1918.

935. SHULL, GEORGE HARRISON. The duplication of a leaf-lobe factor in the shepherd's-purse. Mem. Brooklyn Bot. Gard. 1: 427-443. 4 figs. July, 1918.—Author studied shepherd's-purse (*Bursa bursa-pastoris*) from many parts of world and found that rosettes in general are of four types previously reported, i.e., *heteris* (with leaf factors *AB*), *rhomboidea* (*aB*), *tenuis*, (*Ab*), *simplex* (*ab*). In previous papers extension of leaf lobing to midrib was ascribed to one gene *B*. Wild plants from Peking, Vicenza, Berlin, Landau (Germany), Groningen, Cardiff, Chicago, New Carlisle (Ohio), show this monomeric condition of "B"-lobing, as evidenced by approximate 3 to 1 F_2 ratios when parents with and without "B"-lobing are crossed. Shepherd's-purse of *heteris* type from Tucson, Arizona, proved exceptional; crossed with a *simplex* type it gave F_2 ratio of *B*:*b* of 10.91:1. Another F_2 group of same origin gave F_2 ratio of 6.46:1 under conditions which tend to suppress dominant characters. 29 such F_2 plants with "B"-lobing gave in F_3 , 19 families with "B"-lobing in all individuals, 3 families with about 15:1 ratio of *B* to *b*, and 7 families with approxi-

mate 3:1 ratios; expected 14:8:8. Several of the 19 *B*-containing families contained small numbers. Author concluded that in Tucson type, duplicate genes *B* and *B'* determine "B" type of lobing. Biotypes from Groningen, Bremen, Berlin, Cardiff, and probably Peking, also have this dimeric "B"-lobing. Morphological complexity of character produced by *B* and *B'*-factors indicate that duplication occurred through physical rearrangement of genotype rather than by repeated mutation, affecting in like manner chromosomes belonging to distinct pairs.—*J. P. Kelly*.

936. SIEMENS, HERMANN W. Das Erfindergeschlecht Siemens. [The Siemens family of inventors.] [Review by Fritz Lenz, from Archiv f. Rassen- u. Gesellschaftsbiol. 12: 163-192.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 95. Mar., 1918.

937. SINGER, KURT. Bemerkenswerter Fall von Thomsencher Krankheit. [Abstract by Kurt Mendel, from Monatsschr. f. Psych. u. Neurol. 41⁴. 1917.] Neurol. Centralbl. 1918: 125. Feb., 1918.

938. SOMMER, ROBERT. Friedrich der Grosse vom Standpunkt der Vererbungslehre. [Abstract by Kurt Mendel, from Sommers Klinik f. Psych. u. nerv. Krankh. 10⁴. 1917.] Neurol. Centralbl. 1918: 118. Feb., 1918.

939. STOUT, A. B. Experimental studies of self-incompatibilities in fertilization. Proc. Soc. Exp. Biol. and Med. 15: 51-54. 1918.—Summary of previous publications on sterility in *Cichorium Intybus*. Results obtained indicate (a) that self- and cross-incompatibilities are strongly in evidence in this species; (b) that self-compatible plants may arise sporadically from parents that are self-sterile even after three generations of self-incompatible ancestry; (c) that the progeny of such plants do not breed true to this character; (d) that the degree of self-compatibility varies greatly; (e) that selection for high degrees of self-fertility continued for four generations has not been effective in isolating a completely self-fertile strain. Self-compatibility and self-incompatibility are entirely independent of differences in vegetative vigor; they operate independently of potential sex vigor; they may operate independently of the purely nutritive relations of embryos to their parent plants; they appear independently of any combination of germ-plasm elements in so far as these can be judged by the expression of characters and their development occurs in both cross-bred and inbred races. Results obtained in chicory make it clear that self-incompatibility and self-compatibility are not to be described as dominant and recessive characters, or paired allelomorphs, and there is no simple Mendelian formula that fits the results. Evidence of similar phenomena in other species considered to be quite in agreement with this conclusion. Factors controlling sex fusions arise in connection with development of sex organs and sex cells as such and are of epigenetic and individual development and are highly variable as to degree, specificity, and transmission in heredity. Phenomenon appears to present some analogy to that of so-called antigen-antibody reactions in immunity, and to isoagglutination and isoprecipitation phenomena.—*D. F. Jones*.

940. STOUT, A. B. Duplication and cohesion in the main axis in *Cichorium Intybus*. Mem. Brooklyn Bot. Gard. 1: 480-485. 1918.—Terms duplication and cohesion are used to designate special type of fasciation of main axis observed in horticultural variety "red-leaved Treviso" of *Cichorium Intybus*. This differs from banded and cone types in that two stem elements of equal size are clearly in evidence. Fasciation is confined to middle and lower portions of stem, main axis often becoming simple at its apex. Degree and extent of duplication are illustrated and described. Torsion is frequently seen. Phyllotaxy is discussed. Seedling abnormalities consisting in reduction or fusing of cotyledons or absence of plumule are described. Author concludes that character is strongly but not completely heritable. Wide variation in degree of duplication in different individuals, and wholly normal plants may occur. Duplication is incompletely dominant in F_1 generation of cross with normal, both as to degree of expression and number of plants affected.—*J. A. Harris*.

941. STARGARDT, K. Über familiäre Degeneration in der Maculagegend des Auges mit und ohne psychische Störungen. [Abstract by Kurt Mendel, from Arch. f. Psych. 58:3. 1917.] Neurol. Centralbl. 1918:122. Feb., 1918.

942. STRAUS, H. Dominanz und Rezessivität bei Weizenbastarden. [Dominance and recessiveness in wheat hybrids.] [Review by G. v. Ubisch, from Diss. Göttingen. 8vo, 33 p. 1 pl. 1914.] Zeitschr. indukt. Abstamm. u. Vererb. 19:139. Mar., 1918.

943. SUMNER, F. B. Continuous and discontinuous variations and their inheritance in *Peromyscus*. III. Amer. Nat. 52:439-454. Aug.-Sept., 1918.—Mutations in four geographical races of deer mice are described. (1) Partially albinic mutant strain with red eyes, no pigment on ears and tail and very pale gray fur, strongly tinged with shade of yellow, approaching "ochraceous buff" is called "pallid." Behaves as recessive to fully pigmented strain. Its complete segregation is in striking contrast to apparent lack of segregation in respect to sub-specific characters which entered into germinal constitution of these same individuals. Of forty-seven F_2 offspring obtained from mating of F_1 *P. sonoriensis rubidus*, four were "pallid." These were progeny of six different fathers and eleven different mothers. The four putative mutants were offspring of single father mated with two of his own sisters. These mothers, by same father, also produced seven dark young. Author believes that these "pallid" mice are true mutants, appearing *de novo* in his cultures and that it is probable that hybridization of such diverse strains was the disturbing element that led to loss or modification of a gene. (2) A yellow mutant from *P. maniculatus gambeli* have larger number of yellow-banded hairs, in proportion to those which are black throughout their entire length, and yellow zone of each hair, occupies on average, considerably larger proportion of its length. On mid-ventral surface, the basal, plumbeous zone is lacking, the hairs being entirely white. These "yellow *gambeli*" came from five parents normally-colored *Peromyscus maniculatus gambeli* (La Jolla race). They produced twenty-one offspring, fourteen of which were normal and seven "yellow *gambeli*." Their origin is uncertain. In inheritance they behaved as simple monohybrid recessives. "Yellows" bred to "yellows" have produced only "yellows." The "pallid" crossed with "yellow *gambeli*" produced one offspring with dark pigmented skin, hair and eyes, the two yellow mutants seeming to be complementary to one another, as were Castle's two yellow races of rats. (3) "Grizzled," a mutant distinguished by white hairs on face. These were discovered in second cage-born generation of *gambeli*. Three mice were found all having descended from same grandparents but not of single fraternity. Their parents and grandparents did not show the "grizzled" character. One specimen also was discovered in second cage-born generation of *P. m. sonoriensis*. "Grizzled" character is hereditary. (4) A caudal skin pigmentation of *P. rubidus* is a hereditary character. (5) White-tipped snout due partly to absence of skin pigment and partly to presence of white hair, appearing in dark race of *rubidus*, is monohybrid recessive mutant.

Author discusses inheritance and variation of these characters on basis of multiple factor hypothesis and of Castle's view of "potency of a unit factor." He states that burden of proof rests upon those who contend that continuous and discontinuous variation and inheritance are reducible to single category, that of discontinuity. "Anything like a proof of this contention appears to be rather lacking."—B. O. Severson.

944. SUTTON, ARTHUR W. "Rogues" among potatoes. Gard. Chron. 64:142. Oct. 5, 1918.—Tubers of Jackson's new variety thought to have arisen by bud-mutation, were found by author to resemble Up-to-date. Quotation by Jackson from Darwin's *Variation of animals and plants under domestication*, chapter 11, p. 410, shows Darwin observed only bud variations in color of skin. Similar bud-mutations are known to all experienced growers. Examples cited are Old Rector of Woodstock which gave potato with skin mottled purple and white, and white sports of Fortyfold and Beauty of Hebron. Other characters of such variations are indistinguishable from original stocks. Bud-mutation of wild *Solanum comersonii* noted by M. Labergerie as giving rise to a large coarse-growing red or violet-skinned

potato was proved by the late M. Philippe Vilmorin and writer to be Blue Giant introduced by Polsen in Germany. Heckle's "mutations" raised from *Solanum commersonii* were also found to have arisen under unsuitably controlled conditions.—H. K. Hayes.

945. SUTTON, IDA. Report on tests of self-sterility in plums, cherries, and apples at the John Innes Horticultural Institution. Jour. Genetics 7: 281-300. 3 fig. Aug., 1918.—Horticultural and genetic study of self-sterility. No evidence found against the view that self-sterility is recessive. No satisfactory cases of failure to set fruit in cross-pollinations which could be surely attributed to cross-incompatibility. Out of many crosses made in the three kinds of fruit only four varieties of plums were found to be cross-sterile but two of these varieties known to have originated from one of the four by bud-mutation and the other is suspected of having similar origin. Varieties studied are classified as self-sterile, partly self-sterile and self-fertile. Tables of the pollinations made and their results are appended, together with three illustrations.—D. F. Jones.

946. THOMSON, J. ARTHUR. On sexual selection. Scientia 24: 22-32. 1918.—Darwin's theory of sexual selection can no longer be accepted in precise form in which he stated it, but it appears that many of his postulates may still be considered wholly or partly valid. Unfortunately term had double meaning, first as applicable to any events connected with sex which gave certain individuals preference over others in respect to mating and production of young; and second, having to do with conscious choice or selection of certain males by females. Now as regards first and more general application of the term, no one who has faith in natural selection can doubt that this operates in special and important ways during the mating period. So-called sexual selection is here nothing more than phase of natural selection. When, however, we postulate a discriminating esthetic sense on part of females, sufficient to distinguish between variations appearing in males, our credulity is more seriously taxed. Author, after reviewing number of post-Darwinian publications dealing with subject, concludes that phenomena connected with courtship certainly produce reactions or emotional states, and that it is not necessary to suppose that females discriminate in esthetic or intellectual manner. Furthermore it can be shown that secondary sexual characters, having at first no significance apart from sex, frequently contribute to richness and variety of life and are thus double advantageous to the race.—T. D. A. Cockerell.

947. TROW, A. H. On "albinism" in *Senecio vulgaris* L. [Abstract by E. Lehmann, from Jour. Genetics 6: 65-74. 1916.] Zeitschr. Bot. 10: 133-137. 1918.

948. TUPPER, W. W., AND H. H. BARTLETT. The relation of mutational characters to cell size. [Abstract by Cyril West, from Genetics 3: 93-106. 1918.] Physiol. Abst. 3: 355. Sept., 1918.—See Bot. Absts. 1, Entry 50.

949. WALTON, L. B. Organic evolution and the significance of some new evidence bearing on the problem. Amer. Nat. 52: 521-547. 5 fig. Oct.-Nov., 1918.—How hereditary character-forming genes were first called into existence, not evolution as a process, nor methods by which characters are inherited, is to-day the important biological problem. Author discusses various trends of genetical discovery and speculation, and states that critical students have not been convinced that environmental stimuli account for new genetic factors. Recurrent "mutations" and parallel mutations in different species cause one to distrust force of mutations in evolution; for one may well believe that any particular mutation under observation sufficiently long, will exhibit recurrent changes. Since differentiation of species in *Drosophila* may have taken place two, or more, millions of years ago, genes common to the two species *melanogaster* and *virilis* may have been preformed for long period of time. From studies of Lillie, Morgan, Woltereck and others on direct and indirect effects of changed metabolism, author concludes that heredity hands down frame-work which within certain limits allows plasticity in development, and that direction of development is determined by physico-chemical influences through suppression of potential units. He also con-

cludes that breeders are "largely, if not entirely, engaged in presenting new combinations of existing units," rather than in the discovery of production of new units. He then inquires whether there may not be evidence, even though circumstantial, which permits new insight, and suggests that turning of earth on its axis, causing sun to appear to move from east to west, may have brought negatively phototactic microorganisms of northern hemisphere to rotate as a rule in reverse, or counter-clockwise direction. With two exceptions, positively phototactic forms rotate clockwise in northern hemisphere. Reverse situation appears to prevail in southern hemisphere. The flagellum is assumed to be orienting organ which is affected by sun. Final conclusion reached is that primary factors of evolution are environmental and thus dynamic.—*R. K. Nabours.*

950. WESTPHAL, A. Beitrag zur Lehre von der amaurotischen Idiotie. [Abstract by Kurt Mendel from Arch. f. Psych. 58¹⁻³. 1917.] Neurol. Centralbl. 1918: 122. Feb., 1918.

951. WEXBERG, E. Eine neue Familie mit periodischer Lähmung. [Abstract by Pilez, from Jahrb. f. Psych. 37: 1917.] Neurol. Centralbl. 1918: 120. Feb., 1918.

952. WHITE, O. E. Inheritance studies on castor beans. Mem. Brooklyn Bot. Gard. 1: 513-521. 6 pl. July, 1918.—Data for F_1 and F_2 of crosses involving five pairs of characters,—green, red blush, mahogany and rose stem colors, seed color patterns, and bloom,—indicate simple Mendelian inheritance. Dehiscent and indehiscent capsules are thought to involve two factor pairs. F_1 of small \times large seeds intermediate, F_2 graded series from size of large parent to that of small parent or smaller. Extreme sizes and some intermediates of F_2 bred true while other intermediates exhibited different ranges of variation in F_3 . Stature, season of maturity, leaf shape, and spike density were studied less fully. F_1 plants of some crosses showed increased seed production and of other crosses no increase over parents.—*R. A. Emerson.*

953. WINGE, Ø. Studier over Planterigets Chromosomtall og Chromosomernes Betydning [Review by G. Tischler, from Dissert. København. 143 p., 1 pl., 46 fig. 1917.] Zeitschr. induct. Abstamm. u. Vererb. 19: 126-130. Mar., 1918.

954. WRZOSEK, ADAM, AND ADOLF MACIESZA. Über die Entstehung, den Verlauf und die Vererbung der durch Rückenmarksverletzung hervorgerufenen Meerschweinchen-Epilepsie. [On the origin, the progress and inheritance of epilepsy, induced in the guinea-pig by injury to the spinal cord.] [Review by H. W. Siemens, from Archiv. f. Rassen- u. Gesellschaftsbiol. 11: 289. 1914-1915.] Zeitschr. induct. Abstamm. u. Vererb. 19: 109-110. Mar., 1918.

955. ZEDERBAUER, E. Alter, Vererbung und Fruchtbarkeit. [Age, inheritance and fruitfulness.] [Review by E. Schiemann, from Verh. k. k. zool. bot. Ges. 61: 81-87. 1917.] Zeitschr. induct. Abstamm. u. Vererb. 19: 138-139. Mar., 1918.

956. ZEDERBAUER, E. Untersuchungen über das Gelingen von Bastardierungen zwischen ungleichalterigen Individuen von *Pisum sativum*. [Investigations on the success of hybridization between individuals of *Pisum sativum* of unlike age.] [Review by E. Schiemann, from Zeitschr. f. Pflanzenzucht. 3: 63-67. 1915.] Zeitschr. induct. Abstamm. u. Vererb. 19: 138. Mar., 1918.

HORTICULTURE

W. H. CHANDLER, *Editor*

[Unsigned abstracts are by the editor.]

957. ALDERMAN, W. H. Experimental work on self-sterility of the apple. Proc. Amer. Soc. Hort. Sci. 14: 94-101. 1918.—This is a preliminary report on extensive work with the problem of the self-sterility in the apple, that the author and his associates are doing.—As

to the details of the work muslin frames were found to be a better covering for the blossoms to be studied than the ordinary paper bags. The set, however, of nearly self-sterile varieties was greater when the blossoms were isolated under paper bags than under the muslin frames. The varieties studied were Rome Beauty, York Imperial, and Wagener.

During the progress of the work about one hundred and fifty thousand flowers have been pollinated and records have been kept of their subsequent behavior. Both Rome Beauty and York Imperial were found nearly self-sterile, but not entirely so. In the case of the Rome Beauty fertilized with Rome Beauty pollen, there was no greater set when the pollen was taken from a separate tree. This same is true of the York Imperial. As to the benefits of cross-pollination with Rome Beauty, the percentage of set was increased $3\frac{1}{2}$ times, with York Imperial 14 times, and with Wagener 7 times, by cross pollination. Much fewer blossoms of Wagener were studied, however, than with the other varieties. The size of the fruit was increased 27.8 per cent. by cross pollination in the case of the Rome Beauty; 42.7 per cent. in case of Wagener.

Some data are presented which seem to indicate that the percentage of set is greater in the case of emasculated blossoms than in the case of blossoms not emasculated. The average number of seed found in self-fertilized Rome Beauty was 3.5; in cross-fertilized 7.1; in self-fertilized York Imperial 2.7; in cross-fertilized 7.0; in Wagener self-fertilized 1.06; Wagener crossed 6.88.

The author suggests this as an explanation of the greater size of the cross pollinated fruit. Germination tests showed that the pollen of the partially self-sterile varieties is viable, and also, that the pollen grains seem to germinate equally well in the stigmatic fluid of their own or other varieties. As a practical test of self-sterility in a Rome Beauty orchard, bees were placed in one section and blooming branches of other varieties were placed among the trees. The percentage of set in this section was 12.6 per cent. against 7.8 per cent. in the section where the trees bloomed equally well, but at the farthest side of the orchard from the bees.

Trees near a Ben Davis tree in the orchard gave 20 per cent. of set. On the following year the percentage of set was in the bees' section 8.3 per cent., in the check 4.3 and near the Ben Davis 15.9 per cent.

958. BREAIZEALE, J. F. The mulch basin system of citrus culture. *California Citrograph* 3: 232. Aug., 1918.—A modification of the mulch basin system is recommended for citrus orchards as a means of reducing the cost of cultivation and conserving soil moisture and organic fertilizing materials. The scheme proposed consists in a combination of the trench and mulched basin systems, the organic materials for use in which to be grown as cover crops between the tree rows. No experimental evidence is offered.—*W. G. Kelly.*

959. CRUESS, W. V. Orange vinegar instead of apple produced here. *California Citrograph* 3: 257. Sept., 1918.—Vinegar of good quality was made in a number of tests in the Citrus By-Products Laboratory of the U. S. D. A., Los Angeles. The process recommended is:—Press out juice from crushed whole fruit. Leave in barrel or wooden tub at about 85°F. until fermentation is complete (3-5 days). Strain the juice. Place in barrel generator previously acidified with unsterilized vinegar. Plans for barrel generator are given. When the vinegar is finished remove from barrel, bottle and pasteurize.—*W. V. Cruess.*

960. DAHL, A. L. Where pineapples come from. *California Cultivator* 51: 417. *Fig. 1.* Oct. 26, 1918.—The science of canning has made it possible for dwellers in every country to enjoy the pineapple in a high degree of quality. The pineapple grows wild in most tropical countries and is exported commercially from the West Indies, Bahamas and Hawaii. In the early 90's, millions of the fresh fruits were canned in Baltimore and a regular line of steamers was operated to carry the fruit from the West Indies. Although pineapple canning is still carried on at Baltimore, the greatest development of the industry has taken place in Hawaii where the packing plants represent the last word in cleanliness and efficiency. The industry has rapidly grown from a production of 2000 cases in 1901 to almost 3,000,000 cases in 1917.

The canning factories are now located mostly in Honolulu, the fruit being shipped not over twenty-two miles from the plantations. Details of the process of harvesting, preparation for canning, and the actual canning process are described.—*I. J. Condit.*

961. EATON, F. M.* *Efficiency in citrus irrigation.* 16 p. San Diego Land Corporation, Chula Vista, California, 1918.—In this paper, which was delivered as an address before the Synopsis Club at the Citrus Experiment Station, Riverside, the author summarizes some general considerations affecting citrus orchard irrigation in Southern California and appends an account of the method used by one large orcharding company in regulating the time between irrigations and the amount of water applied, on the basis of laboratory soil moisture determinations. The system used has for its basis the determination of the moisture equivalents and wilting coefficients of the different types of soil involved and an attempt is made to keep the soil moisture content as near the former as possible, it being deemed that this constant approximates the optimum moisture content. A full description of the apparatus used and methods pursued is given. Methods of furrowing as adapted to different soil types are considered. The contention is made that fully as many orchards suffer for lack of sufficient water as on account of over-irrigation. Some relations of the penetration of irrigation water and root distribution to irrigation practice are brought out. A cooperative system for a rational irrigation practice in citrus orchards is suggested.—*R. W. Hodgson.*

962. FLOYD, B. F. *Injury to citrus trees by the improper use of ground limestone.* Rept. of Plant Physiologist. Florida Agric. Exp. Sta. 1917: 35 R-46 R. May, 1918.—In pot experiments with citrus trees the presence of ground limestone produced a distinct injury characterized by two types of yellowing: (a) a frenching, or lack of green color in the areas between the largest veins, and (b) a chlorosis consisting of a more or less complete yellowing or whitening of the leaves. Both types had a quantitative relation to the limestone in the soil and more injury was induced in sandy soils than in loam soils. Both cottonseed meal and sulphate of ammonia, when applied to plants growing in soil containing no limestone, produced frenching but not complete chlorosis.—*R. D. Anthony.*

963. KINMAN, C. F. *The mango in Porto Rico.* Porto Rico Agric. Exp. Sta. Bull. 24. 30 p. Pl. XI. Feb. 4, 1918.—The common mango of Porto Rico, which is one of the most important fruits of the island, is not cultivated but grows wild in all localities. Superior varieties lately imported have proved satisfactory and should be planted extensively for market and home use.—Mango trees are adapted to a wide range of soil types and will grow satisfactorily in practically all Porto Rican soils, provided there is a good subdrainage.—While the climate throughout the island is suitable for the growth of mango trees, in some localities, notably through the interior and along the northern slopes, rains are sometimes too frequent during the blossoming season to permit the setting of a good crop of fruit. Along the western and northern lowlands rainfall is light during the blossoming season and good crops are almost invariably secured.—As the prevailing winds and morning sun seem to be very beneficial, both for growth of trees and setting of fruit, open, exposed sites should be selected for the mango orchards.

Inarching and bark grafting, simple methods for asexual propagation, are satisfactory both for use in the nursery and for topworking large trees. The important conditions in grafting are that the stock be just starting a new growth, the scion mature, and the buds ready or almost ready to open.—Large seeds which produce only one plant are most satisfactory for stocks. The East Indian varieties produce larger and more thrifty plants, as a rule, than the native kinds. Both nursery and other mango trees may be transplanted successfully if they are not making a new growth and rainfall is plentiful.

The present confusion in the classification of types of mangoes, as well as the great variation in growth and productiveness of trees, and quality of fruit, necessitates a thorough study of varieties before a mango orchard can be successfully planted in Porto Rico.—Among a number of imported varieties that have fruited here, the most productive of the thrifty kinds with fruits of high quality are Cambodiana, Totafari, Amini, Bennett, and Paheri.

Cambodiana and Paheri are probably better suited to home than to commercial use.—The trees of the few varieties from Martinique, Trinidad, and South America thus far tested lack vigor, while the fruits are either inferior in quality or too small to be promising for general planting. As regards size, flavor, fiber content, and keeping quality, the wild Porto Rican mangoes are less desirable than many imported kinds.

In harvesting mangoes that have not softened on the tree, a stem longer than a fruit stalk should be left to prevent the juice from escaping through the fruit stalk and leaving passages for the entrance of infection.—Fruits in orange wrapping paper did not ripen or decay so quickly as those wrapped in oil paper, newspaper, or coconut fiber, or those left in the open air. Fruits packed in coconut fiber ripened earliest.—East Indian varieties showed much better keeping qualities than the native kinds.

The mango is one of the most satisfactory ornamental trees for Porto Rico, as variations in habits of growth and color of foliage make it possible to select from varieties producing fruit of high quality those which best carry out a particular scheme of landscape gardening.—*I. J. Condit.*

964. KNIGHT, L. J. Physiological aspects of self-sterility of the apple. *Proc. Amer. Soc. Hort. Sci.* 14: 101-105. 1918.—The work was done largely with Rome Beauty pollinated by Rome Beauty and Rome Beauty pollinated by Jonathan. The material was killed by Gilson's fluid and preserved for study in 70 per cent. alcohol.—The studies indicate that there is no stylar canal, and the pollen tubes make their way through the tissue. There is decomposition of the cells along this path or extrusion of mucilage. The progress of Jonathan tubes in Rome Beauty pistils seems to be facilitated, while that of Rome Beauty seems to be hindered. The embryo in Rome Beauty cross Jonathan at 192 hours was 2 to 3 celled, and by 240 hours was many celled. There was a marked effect of temperature on the rate of growth of Rome Beauty cross Rome Beauty tubes.—At a moderate temperature Rome Beauty tubes require 91 to 120 hours to traverse the Rome Beauty style. At a temperature of 80° to 90°F. only 24 hours were required. At moderate temperatures fertilization occurred within 24 hours in case of Rome Beauty cross Wagener and Wagener cross Rome Beauty.

The author thinks that occasional self-fertility may possibly be explained by the effect of high temperature on the rate of growth of the pollen tube. Asparagin (a trace) in 3 per cent. fructose solution increased rate of growth of the pollen tube. In a pollen tube 5 hours old one-twentieth mm. long 2 to 4 plugs are forming and the pollen tube is very soon shut off from the pollen grain and must, therefore, secure its nourishment from the stylar tissue.—The author draws the following conclusion:

(1) Self-sterility of Rome Beauty is not due to sterility of the pollen, as has been shown to be the case in certain varieties of grapes.

(2) Sensitiveness of pollen to overabundant moisture supply is not involved here as a factor, as has been shown by Jost for the pollen of many grasses, barley especially; and by J. N. Martin for the pollen of red clover. The pollen of Rome Beauty and many other varieties germinated well in distilled water.

(3) Rome Beauty stigmatic extract offers no inhibition to the germination and growth of Rome Beauty pollen.

(4) Rome Beauty stigmas offer no particular mechanical obstruction to the penetration of Rome Beauty tubes.

(5) Self-sterility of Rome Beauty is not due to inability of its own pollen tubes to grow deep enough to reach the egg. This has been suggested as the cause of self-sterility in certain pear and apple varieties by the work of Osterwalder.

(6) From present indications one important factor in self-sterility of Rome Beauty is the relatively slow rate of growth of Rome Beauty tubes in Rome Beauty stylar tissue. Doubtless other factors will be found upon further investigation.

965. LATHAM, CONSUL C. L. The orange oil industry in Jamaica. *California Cultivator* 50: 261. Mar. 2, 1918.—The orange oil industry in Jamaica dates from the Messina earthquake in 1908 which temporarily demoralized the Sicilian oil industry. The oil is extracted

on a "rinder" which is a shallow, tin-lined copper vessel studded thickly with copper tacks $\frac{3}{4}$ inch long, pointing upward and inward. The bottom consists of a funnel shaped oil receptacle which can be closed at lower and smaller end. The rinder is placed between the press; the orange is rolled on the points until no more oil exudes. When the receptacle is filled, the oil is poured through a cloth. Frequently the oil must be allowed to settle to remove mucilage and juice. It is filtered into copper containers lined with tin. Mechanical rinders have been unsuccessful. Work is done by women and children at low wages. Yield of oil is low. The rinders are carried to the scattered trees and the oil is extracted on the spot. This reduces transportation costs. Fruit must not be too ripe or dark colored oil will result. Twelve hundred oranges yield $2\frac{1}{2}$ pounds of oil. Eight hours work is necessary to give 1 pound of oil per worker. Oil of best quality is secured when extracted early in the morning. Extracted oranges are discarded or fed to stock.—*W. V. Cruess.*

966. MARKARIAN, HENRY. How we can improve the quality of our dried figs. *California Cultivator* 50: 100. Jan. 26, 1918.—Contains practical advice to fig growers.

967. MILLER, C. C. Bud curl of the lemon tree. *Monthly Bull. California State Comm. Hort.* 7: 515-519. *Figs. 70-74.* Sept., 1918.—Bud curl is a term used by the writer for the enlargement of the trunks of lemon trees just above the bud-union where a piling-up of woody material goes on from year to year. The accumulation of this woody material results in extreme cases in a condition designated as "bud pinch" which constricts the bark and prevents the free passage of elaborated plant food to the roots. Some improvement can be gained by cutting through the bark from an inch below to an inch above the pinched area. If the pinching has continued for several years and the tree has suffered as a result, it is recommended that the tree be removed and a new one planted.—*I. J. Condit.*

968. POPENOE, W. Agricultural explorations in Mexico. *California Citrograph* 4: 2. Nov., 1918.—As an agricultural explorer for the University of California, Mr. Popenoe reports the results of investigations made in different parts of Mexico during 1918. His studies were made in Tampico, State of Tamaulipas and the State of Vera Cruz. Notes are given regarding the occurrence of Avocados, Chayotes, Mangos, Annonas, and a species of Attalea, the seed of which are utilized for oil.—*I. J. Condit.*

969. TAYLOR, R. H. The almond in California. *California Agric. Exp. Sta. Bull.* 297. P. 1-72, fig. 28. 1918.—Reports results of observation and study of almond industry in more important districts of California for past six years.—Concerning the habit of the almond plant, it is the first of deciduous fruit trees to start growth and bloom in spring and normally the last one to shed its leaves in fall; has a short rest period; young trees may bloom three or four days later than old trees; the wood is very hard and strong, but somewhat subject to heart rot, and all varieties are self-sterile and some are inter-sterile. Thus Nonpareil and I X L are inter-sterile; also Languedoc and Texas and I X L with Peerless. The nuts are of two general classes—sweet and bitter.

When properly pruned and conditions of soil and moisture are favorable the nuts grow and ripen more satisfactorily in the greater heat of the interior valleys than along the coast. The tree is considered hardy and able to endure fully as much cold as the hardest peach, without injury. Blossoms with petals beginning to fall have in some cases withstood 28°F. In other cases temperatures of 30° and 31°F. have killed blossoms with the petals falling. The duration of these temperatures is not given. After the young fruit has attained the size of a pea it rapidly becomes less resistant to low temperatures.—Practical directions for growing, including disease and insect control and for harvesting are given with discussion of varieties and classification.—*E. L. Overholser.*

970. WILSON, C. P. Summary of talk on lemon by-products. *California Citrograph* 3: 140, April, 1918.—About 6 per cent. of crop of members of Exchange By-Products Co. shipped to factory at Corona last season. The calcium citrate made by this company contains about 70 per cent. citric acid compared to a possible 73.7 per cent. The Exchange Company's

citrate averages about 6 per cent. higher in citric acid content than does the usual commercial citrate. During 1916-17 season the Company used 5120 tons of lemons; produced 180,000 pounds of citric acid and returned \$10 per ton to growers; this is \$4 per ton better than previous season. Estimated increase in lemon crop for next six years is 114 per cent. If present rate of increase in consumption of fresh fruit is increased five times it will still leave 60,000 tons of fruit to be disposed of. Lemon oil and citric acid must form basis for their utilization. This amount of fruit will yield 500,000 pounds of lemon oil, and 500,000 pounds of citric acid, or provide half of present consumption of acid in United States and all our lemon oil there consumed. Value conservatively of \$1,600,000. Authorized capital of the Company is now increased to \$200,000 to permit development of other products. Manufacture of oil and candied, dried or brined peel contemplated. By-products are made at cost. All dividends are returned to members of the Exchange, who are growers.—W. V. Cruess.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

[NOTE. The title of this section is wrongly printed in previous issue of Bot. Absts. (vol. I, p. 99), where "of vascular plants" should be deleted. With the coming rearrangement of sections the restricted title will apply, but is not yet in force.—*Ed.-in-Chief*.]

THALLOPHYTES

971. ATKINSON, G. F. Development in gymnocarpous Agaricaceae. Bot. Gaz. 66: 459-460. 1918. [Review of: Douglas, Gertrude E. The development of some exogenous species of agarics. Amer. Jour. Bot. 5: 36-54. Pl. 1-7. 1918; and Blizzard, A. W. The development of some species of agarics. Amer. Jour. Bot. 4: 221-240. Pl. 6-11. 1917.]—Summary of chief results of these two papers. Reviewer notes that in gymnocarpous forms the origin and general course of development of hymenophore corresponds with that of angiocarpous forms of the Agaricus type. [See Bot. Absts. 1, Entry 65.]

PTERIDOPHYTES

972. BOWER, F. O. Studies in the phylogeny of the Filicales. VII. The Pteroideae. Ann. Bot. 32: 1-68. 43 figs. 1918. [Abst. by Coulter, J. M., Bot. Gaz. 66: 183. 1918.]—See Bot. Absts. 1, Entry 62.

973. CHAMBERLAIN, CHARLES J. Prothallia and sporelings of lycopods. Bot. Gaz. 65: 565-568. 1918. [Review of: Holloway, J. E. A comparative study of the anatomy of six New Zealand species of Lycopodium. Trans. New Zealand Inst. 42: 356-370. Pl. 31-34. 1909. Idem. Studies in the New Zealand species of the genus Lycopodium. Part I. Ibid. 48: 253-303. Pl. 17, 18. 102 figs. 1916. Idem. Studies in the New Zealand species of the genus Lycopodium. Part II. Methods of vegetative reproduction. Ibid. 49: 80-93. Pl. 8, 9, 24. fig. 1917. Lawson, A. Anstruther. The prothallus of *Tmesipteris tannensis*. Trans. Roy. Soc. Edinburgh 51: 785-794. Pl. 1-3. 1917. Idem. The gametophyte generation of the Psilotaceae. Ibid. 52: 93-113. Pl. 1-5. 1917.]—Reviewer summarizes Holloway's work on comparative anatomy and on prothallia of the New Zealand species of Lycopodium. The radial type of stele is believed to be primitive and the banded type derived from it. Considerable variation in stelar anatomy of adult plant is noted. Prothallia of 10 species are described, several of them for the first time, but no type strictly new to the genus is discovered. Methods of vegetative propagation are dealt with. Author believes that various sections of genus have not been separated from very ancient times but are rather closely interrelated.

Reviewer summarizes Lawson's work on prothallia of *Tmesipteris* and *Psilotum*. He takes issue with author's statement that gametophyte of *Psilotum* bears no structural

resemblance to that of *Lycopodium*, and believes that evidence from prothalia indicates relationship between Psilotales and Lycopodiales.

974. KASHYAP, S. R. Notes on *Equisetum debile* Roxb. Ann. Bot. 31: 439-445. 3 fig. 1917.—Endodermis and prothallium were studied and position of former is described. Character of prothallium varies according to thickness with which spores are sown. [From abst. by Coulter, J. M., Bot. Gaz. 65: 491. 1918.]

975. STEIL, W. N. Studies of some new cases of apogamy in ferns. Bull. Torr. Bot. Club. 45: 93-108. Pl. 4, 5. 1918. [Abst. by Coulter, J. M., in Bot. Gaz. 66: 80. 1918.]—See Bot. Absts. 1, Entry 276.

SEED PLANTS

976. BROWN, MABEL MARY. The development of the embryo sac and of the embryo in *Phaseolus vulgaris*. Bull. Torrey. Bot. Club 44: 535-544. Pl. 25, 26. 1917.—Morphology of this species presents nothing unusual. [From abst. by Coulter, J. M., Bot. Gaz. 65: 376. 1918.]

977. BUCHHOLZ, JOHN THEODORE. Suspensor and early embryo of *Pinus*. Bot. Gaz. 66: 185-228. Pl. 6-10, 3 fig. 1918.—Embryos with basal portions of old archegonia and suspensors were taken from living ovules by removing upper portion of gametophyte and teasing them out. These were stained and mounted *in toto*. At time of fertilization starch grains appear in cells of gametophyte just beneath archegonia. Prior to elongation of suspensors, these starch-containing cells break down and form the corrosive cavity into which developing embryo is pushed by growth of suspensor. Each of the 4 cells in the embryonal group of proembryo is an apical cell. These do not divide until after tier of suspensor cells has begun to elongate. By two successive divisions the apical cells cut off first and second embryonal tube initials; these elongate, forming secondary suspensors. The 4 vertical rows of cells thus formed always separate and develop 4 embryos, thus producing polyembryony by cleavage. A primary suspensor tube never divides to form 2 tubes, but embryonal tube initials may, before elongation, divide by periclinal walls into 2 or more cells all of which elongate together. As succeeding embryonal tubes are cut from apical cell, they divide by vertical walls. When cell walls are laid down in the proembryo, the cells at the organic apex begin to function as apical cells. The primary suspensor and from 2 to 4 embryonal tubes are cut off from one face of apical cell before the tetrahedral apical cell is organized. This apical cell with three cutting faces persists until a cylindrical body of several hundred cells is formed, nearly all of which later take part in the formation of the secondary suspensor. The rosette cells are embryo initials. These embryos grow by apical cells with three cutting faces, but growth ceases before they reach any considerable size. Thus an archegonium normally produces 8 embryos. In some cases the rosette cells elongate and resemble the suspensor except that their cells divide and those of the primary suspensor never do. No evidence was found that twin embryos may arise by splitting of one of the 4 primary embryos, and no seeds were found in which two of the primary embryos had developed equally and fully. The first body region to appear is the plerome of root tip; stem tip occurs in position formerly occupied by apical cell and is followed by ring of cotyledonary primordia. Number of primordia varies from 3 to 7; in some instances 2 were found to fuse to form one cotyledon, but at no stage is a cotyledonary tube formed.—A number of abnormalities are cited, the most striking being frequent occurrence of 2 gametophytes in same ovule of *P. Banksiana*. Author discusses development of embryo in *Pinus* in relation to that of other conifers and concludes that "*Pinus* is a very primitive and ancient genus."—Margaret C. Ferguson.

978. HARVEY, LEROY H. Polyembryony in *Quercus alba*. Michigan Acad. Sci. Rept. 1917: 329-331.—Records a case of polyembryony in *Quercus alba* and gives a summary of recorded cases of polyembryony in angiosperms. [From abst. by Coulter, J. M., Bot. Gaz. 66: 184. 1918.]

979. ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Bot. 32: 277-317. pl. 1, 14 fig. 1918.—*O. nutans*, *O. pycnocarpa* and their hybrids were studied. An axial row of 4 megaspores is formed. The micopylar or chalazal spore or both may develop into embryo sacs. Mother cell of embryo sac remains at micopylar end and divides twice. Mature embryo sac is tetranucleate with normal well defined egg apparatus but with no antipodals or chalazal polar. Polar nucleus increases in size, becoming identical in appearance with an ordinary endosperm nucleus which results from fusion of polar nuclei. Members of the egg apparatus are surrounded by cellulose walls, but this wall does not extend over lower part of oosphere. Rod- or biscuit-shaped structures suggesting chondriosomes were sometimes found in egg cell. When shed, pollen grain contains a vegetative nucleus and a generative nucleus and is packed with fusiform starch grains. Forty-eight hours after pollination tube has reached embryo sac. Each male nucleus is surrounded by definite mass of protoplasm. The vegetative nucleus was not detected after the tube had reached embryo sac. Pollen tube invades the synergid through the filiform apparatus, wall of synergid bursts and its contents flows over the lower part of the oosphere. The 2 sperm cells always pass through synergid to egg cell or pole nucleus. The sex nuclei come in contact as resting nuclei and fuse, giving rise to a large nucleus with 2 nucleoli. Triple fusion occurs and the endosperm nucleus contains diploid number of chromosomes. 16 endosperm nuclei are formed before fertilized egg divides. 3 male nuclei were sometimes observed in same embryo sac, 2 fusing with egg nucleus and 1 with polar. This triple fusion in egg nucleus might account for the triploid mutants reported in *Oenothera*. Sterility of certain hybrids results from slow growth of pollen tube.

Examination of large number of genera indicates that embryo sacs of all genera of Onagraceae are tetranucleate. They are monosporic, but in other families, tetranucleate sacs may be bisporic or tetrasporic in origin. It is pointed out that with rare exceptions plants with tetranucleate or 16-nucleate sacs are herbaceous, and may be regarded as derived types resulting from mutation and variation in the course of phylogenetic development. [See Bot. Absts. 1, Entries 482, 980.]—Margaret C. Ferguson.

980. ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Bot. 32: 277-317. 1 pl., 14 fig. 1918. [Abst. by Coulter, J. M., Bot. Gaz. 66: 184. 1918.]—See Bot. Absts. 1, Entries 482, 979.

981. SMALL, J. The origin and development of the Compositae.—II. The pollen presentation mechanism. New Phytol. 16: 198-221. 4 fig. 1917.—Author distinguishes 14 types of style and 16 of stamens in Compositae, and discusses their phylogenetic significance. [From abst. in Exp. Sta. Rec. 39: 29. 1918.]

982. WENIGER, WANDA. Fertilization in *Lilium*. Bot. Gaz. 66: 259-268. Pl. 11-13. 1918.—*Lilium* is again studied, this time from standpoint of cytological phenomena of fertilization. Chromatin of sperm and egg nucleus forms distinct spiremes before nuclear membrane of either nucleus disappears. Spiremes never fuse but segment independently into 12 chromosomes each. These associate in pairs and divide transversely. Of the 48 segments thus formed 24, one half maternal one half paternal, pass to each pole. In triple fusion 3 distinct spiremes are formed. There is no pairing of chromosomes in this division and each splits longitudinally as in ordinary vegetative division.—Margaret C. Ferguson.

983. WOLFE, JAMES J. Alternation and parthenogenesis in *Padina*. Jour. Elisha Mitchell Sci. Soc. 34: 78-109. 1918.—The results of numerous experiments are described and also embodied in a series of eleven tables. The experiments cover behavior of tetraspores, fertilized eggs and unfertilized eggs. The former produce only male and female plants in approximately equal numbers; fertilized eggs produce tetrasporic plants only; unfertilized eggs undergo divisions but fail to mature.—W. C. Coker.

984. BEEKMAN, H. Investigations with wood conducted at the forestry experiment station. Boschbouwk. Tijdschr. Tectona 11: 1-82. Pl. 1, 10 fig. 1918.—Includes work on identification of woods of the Dutch East Indies by anatomical structure. [From abst. in Exp. Sta. Rec. 39: 246, 1918.]

1001. LEMOINE, MADAME PAUL. Contribution a l'étude des Corallinacées. Bull. Soc. Géol. France. iv, 17: 233-283, 23 fig. (1917) 1918.—A comprehensive paper comprising four distinct contributions to the knowledge of the fossil Corallinaceae. Part 1—Généralités sur la structure des Corallinacées (pp. 233-240) discusses the morphology of the known forms. Part 2—Etat actuel de nos connaissances sur les Corallinacées fossiles (pp. 240-256) is an extremely valuable summary of the existing state of knowledge, listing all of the known fossil forms with their geologic and geographic occurrences. The list will surprise students of recent forms since it includes a large number of types, some present in ages as remote as the Cambrian, and serving to emphasize the importance of these algae in reef building. A complete bibliography is appended to this part. Part 3—Corallinacées fossiles de la Martinique (pp. 256-279, t. f. 1-23) is devoted to the description and figuring of new species all of which are probably of lower Miocene (Aquitanian) age, although some were contained in rocks ejected during the eruption of Mont Pelée and therefore of uncertain age. The species all of which are new, comprise 4 of *Lithothamnium* (*peleense*, *caravellense*, *Douvilliei*, *Lacroixi*), 6 of *Lithophyllum* (*Giraudi*, *premoluccense*, *martinicense*, *preprototypum*, *prelichenoides* *Dublanqueti*), one each of *Corallina* (*Cossmanni*), *Arthrocardia* (*Mangini*) and *Amphiroa* (*prefragilissima*). Some of these are very satisfactory, showing conceptacles with spores. Part 4—(pp. 280-283) records the occurrence of *Lithophyllum amphiroaeformis*, described originally by Rothpletz from the Upper Cretaceous (Turonian) of France (Var.), in the late Lower Cretaceous (Albian) of Landes, France.

1002. LUNDQVIST, T. Variationstypen von *Baiera minuta* Nathorst. Geol. Fören. Förhandl. 40⁵: p. 491-502. 9 text fig., 9 pl. 1918.—Discusses the variations in leaf form of *Ginkgo minuta* Nathorst, as shown by a series of well preserved specimens from the *Lepidopteris ottonis* zone of the Rhaetian or late Triassic coal deposits of Bjuf in Sweden. The author regards these forms as referable to the extinct genus *Baiera* instead of to *Ginkgo* and shows that they vary through almost as wide limits as do the leaves of the existing *Ginkgo biloba*, some of the variants of the latter suggesting this ancient fossil species. *Baiera minuta* in its larger forms has deeply divided non petiolate leaves resembling closely the typical and wide-ranging late Triassic species *Baiera muensteriana* (Presl.) Heer, while other and smaller leaves show fewer divisions and an incipient petiole suggesting these features of various Jurassic species of *Ginkgo* and some of the variants of the still existing species.

1003. RAMSAY, W. Växtförande aflageringar och det postglaciala havets gräns i Liljendals socken, Nylands län. Geol. Fören. Förhandl. 40⁵: 529-534. 1918.—Describes the late Quaternary or post-glacial deposits of Liljendal which are situated about 75 km. northeast of Helsingfors in district of Nyland, Finland. Two horizons contain fossil plants. The older of these is correlated with the time during which the Baltic region was shut off from the ocean and known as the Ancylus Lake, the climate being dryer and warmer than at present. The younger horizon is correlated with that part of the post-glacial when the Baltic had re-established its connection with the Atlantic and is known as the Litorina sea, at which time the climate appears to have been much warmer than at the present time. The Ancylus flora as represented at Liljendal comprises 28 species including *Pinus*, *Picea*, *Alnus*, *Betula*, *Rhamnus*, *Populus*, *Robus*, *Nuphar*, *Potamogeton*, *Phragmites*, *Scirpus*, *Carex*, and numerous diatoms. The Litorina flora contains *Pinus*, *Alnus*, *Betula*, *Tilia*, *Phragmites* and diatoms.

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

1004. ALLARD, H. A. Effects of various salts, acids, germicides, etc., upon the infectivity of the virus causing the mosaic disease of tobacco. Jour. Agric. Res. 13: 619-637. 1918.—The writer treats the virus solution (juice from diseased plants) with a solution of the compound

under investigation. The concentration of the various compounds are, wherever possible, given as grams of water-free reagent in cubic centimeters of virus solution. The effect of the reagent on the virus was determined by inoculating healthy tobacco plants with the mixture and observing the effect. The concentrations of nitric and hydrochloric acid necessary to affect the infectivity of the virus solution was 1 gram in 50 to 100 cc.; for phosphoric, citric and acetic, 1 gram in 20 to 50 cc. The ability to infect tobacco plants was not destroyed when the virus was treated with 1 gram in 100 cc. of aluminum sulphate, silver nitrate or mercuric chloride; 1 gram in 200 cc. of lead nitrate; 1 gram in 50 cc. of lithium nitrate, sodium carbonate or sodium nitrate; and 1 gram in 12.5 cc. of manganese sulphate. These were highest concentrations of these salts used. It required about 1 gram of sodium hydroxid to 2000 cc. of virus solution, 1 gram to 500 cc. of copper sulphate, 1 gram to 100 cc. of zinc chloride, and 1 gram to 100 cc. of potassium permanagante to produce any noticeable effect. Carbolic acid "creolin," cresol and "Phenaco" affected the infectivity of the virus but little. Chloral hydrate, naphthalene crystals, camphor and thymol had no appreciable effect. Glycerine, sodium benzoate, quinine bisulphate, tannic acid, sodium taurocholate, and saponin affected the infectivity of the virus in rather high concentrations. The virus could be preserved in 45 per cent ethyl alcohol for 21 days or 40 per cent acetone for 77 days without destroying the infective principle. Higher concentrations of these two substances affected it. Four per cent. formaldehyde quickly destroyed its infectious properties as did mixing it with talc, kaolin or soil for a period.—*Lon A. Hawkins.*

1005. ALLEN, F. W. Picking the apple for flavor and keeping quality. *Proc. Washington State Hort. Assoc.* 14: 106-110. 1918.—The apple troubles considered are ordinary and soft scald and Jonathan spot. Premature picking increased the amount of scald, and late picking increased the amount of Jonathan spot.—*F. D. Heald.*

1006. BROWN, H. B., AND C. T. AMES. Cotton experiments, 1917. *Mississippi Agric. Exp. Sta. Bull.* 184: 1-27. Feb., 1918.—Includes a test of varieties of cotton more or less resistant to the wilt disease caused by *Fusarium vasinfectum*. Gives the percentage of wilt and the money value of the cotton produced. A variety showing high resistance to the wilt is not always the best yielding variety under boll weevil conditions.—*C. W. Edgerton.*

1007. EDGERTON, C. W. Delayed ripening of tomatoes caused by spraying with Bordeaux mixture. *Louisiana Agric. Exp. Sta. Bull.* 164: 1-16. *Fig. 1-4.* Sept., 1918.—While Bordeaux mixture will check the leaf diseases caused by *Alternaria solani* and *Cladosporium fulvum*, it also causes a delayed ripening of the fruit and does not always result in a greater yield. Results of three years tests show that the delay in ripening caused by spraying may be as much as one to two weeks. Spraying is advocated only to check serious epiphytotics.—*C. W. E.*

1008. FISHER, D. F. The abuse of water on fruit and trees. *Proc. Washington State Hort. Assoc.* 14: 19-27. 1918. A discussion of chronic drouth as affecting growth of apple trees and the size of fruit; sudden and acute drouth as the cause of spot necrosis or drouth spot; drouth in late July and August as the cause of "punk;" the relation of soil type and shortage of water supply to cork. Results of irrigation experiments on bitter pit are given showing an increase with heavy or over-irrigation and a reduction with heavy irrigation followed by light applications. The claim is made without the presentation of experimental evidence, that "collar rot" in the Northwest is not the result of the abuse of irrigation water (winter injury), but is generally caused by the bacteria of fire blight.—*F. D. Heald.*

1009. FROMME, F. D., AND W. J. SCHOENE. Dusting and spraying for apple scab and codling moth. *Rept. Virginia State Entomologist and Plant Pathologist* 1916-17: 22-26. 1918.—A dusting mixture of sulfur, hydrated lime, and arsenate of lead gave satisfactory control of apple scab under conditions of moderate infection but was not as efficient as liquid applications of lime-sulfur solution under conditions of heavy scab infection. Considerable burning of fruit and foliage resulted from the arsenate of lead in both dust and liquid mixtures.—*Fromme.*

1010. GAINES, E. F. Comparative smut resistance of Washington wheats. Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 21-25. 1918.—Of ten varieties tested Turkey was the most resistant and the club hybrids the most susceptible. Hybrid 128, one of the most susceptible of the club wheats, gave however the highest acre value under field conditions.—F. D. Heald.

1011. GARDNER, V. R. Pollination of sweet cherries. Proc. Washington State Hort. Assoc. 14: 72-77. 1918.—Mainly a discussion of improper pollination as a cause of sterility or the failure to set fruit.—F. D. Heald.

1012. HEALD, F. D. The most effective method of controlling smut. Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 26-34. Fig. 1. 1918.—Reports of the occurrence of large numbers of spores of *Tilletia tritici* on grain threshed from apparently smut-free fields; the ineffectiveness of seed treatment for fall plantings due to soil infestation from wind-blown spores; a summary of the results on the "smut shower" for the seasons of 1915 and 1916. A discussion follows on the relation of time of planting to the percentage of smut. Carefully treated winter wheat shows varying amounts depending upon the seeding time, ranging from none to 5 per cent, in August plantings to a maximum of 30 to 40 per cent., in early October, followed by a decline through the later seedings. The early seedings were not only nearly smut-free but survived the winter much better than the late seedings. A summary of the cooperative work on the use of smut exhaust fans on threshing machines is reported.—F. D. Heald.

1013. HEALD, F. D. Diseases of the potato. Proc. Washington State Hort. Assoc. 14: 115-124. 1918.—Popular presentation of losses from potato diseases, their cause and their prevention or control by rogueing, seed selection, proper handling and storage, spraying, seed disinfection and soil management.—F. D. Heald.

1014. JONES, L. R. Disease resistance in cabbage. Proc. Nation. Acad. Sci. 4: 42-46. 1918.—See Bot. Absts. 1, Entries 321, 903.

1015. MACKIE, W. W. A possible new fungicide for wheat and barley smut. Science 48: 515-516. 1918.—Preliminary seed-treatment tests with lime-sulfur solution for the control of stinking smut of wheat and covered smut of barley have given promising results. In comparison with the bluestone-lime dip now commonly used on the Pacific coast, the lime-sulfur dip is said to be cheaper and easier of application in that it involves single instead of double dipping. It produces no noticeable deleterious effects on germination and fully protects seed sown in smut-infested soil.—V. F. Tapke.

1016. MACMILLAN, H. G. An epidemic of corn smut following hail. Phytopath. 8: 584-585. 1918.—Two weeks after severe hail storm 19 per cent. of stalks of maize showed uniformly small smut boils (*Ustilago zeae*). Outside the hail area 1 per cent. infection was found. Lesions occurred only at leaf axils, never at bruises. It is thought that hail may have broken open the boils and have allowed for the distribution of an unusually large number of spores.

1017. MCCLINTOCK, J. A., AND L. B. SMITH. True nature of spinach blight and relation of insects to its transmission. Jour. Agric. Res. 14: 1-60. 1918.—Results of a study of spinach blight in eastern Virginia. Estimated loss from disease is \$200,000 to \$400,000 yearly. Disease is characterized by a yellow mottling of the leaves which are small, malformed and become brown and die in the later stages. The disease can be transmitted by inoculating healthy plants with juice from diseased individuals. Infection is spread by aphids. Two species, *Macrosiphum solanifolii* and *Rhopalosiphum persicae* are commonly found on spinach in that region and both act as carriers. *M. solanifolii* is apparently more important in spreading

the disease.—Non-virus bearing aphids must feed on diseased plants from two minutes to fourteen hours before they become a carrier. Virus bearing aphids produced infection in healthy plants when allowed to feed on them for two minutes. Infection may be carried to several healthy plants by one aphid. Virus bearing aphids do not lose ability to transmit the disease during moulting, and infections were obtained from the offsprings of virus bearing aphids which had not previously partaken of food.—Control of aphids infesting spinach offers most immediate possibility for control of the disease.—*Lon A. Hawkins.*

1018. MELCHERS, LEO E. Potato seed diseases and their treatment. Kansas Agric. Exp. Sta. Circ. 63. 1918.

1019. MELCHERS, LEO E. The mosaic or white pickle disease of cucumbers. Trans. Kansas State Hort. Soc. 34: 102-104. 1918.—A description of white pickle and its symptoms as occurring in greenhouses in Wichita, Kansas. The disease ruined about 20 per cent. of the crop. Sanitary measures advocated.—*L. E. Melchers.*

1020. MELCHERS, LEO E., AND JOHN H. PARKER. Another strain of *Puccinia graminis*. Kansas Agric. Exp. Sta. Circ. 68. May, 1918.—A biologic form of stem rust of wheat which has been given the name *Puccinia graminis tritici-inficiens* has been reported as occurring in Kansas and Minnesota. It is physiologically distinct from *Puccinia graminis tritici*, in that it attacks three differential wheats: Kanred, P1066 and P1068, which recently were published by the authors as showing marked resistance to *Puccinia graminis tritici*. It is likewise physiologically distinct from *Puccinia graminis tritici-compacti*, in that it vigorously attacks Haynes Blue Stem (Minn. 169), which is known to be non-congenial to *Puccinia graminis tritici-compacti*.—*L. E. Melchers.*

1021. NEAL, DAVID C. Sweet potato stem-rot or wilt. Louisiana State Univ. Extens. Circ. 28: 1-4. Oct. 1918.—Describes the stem-rot of sweet potato caused by *Fusarium* and gives methods of control, including seed selection, seed-bed sanitation and crop rotation. Home selection of seed is preferable to buying seed from other localities.—*C. W. Edgerton.*

1022. OSNER, GEORGE A. Additions to the list of plant diseases of economic importance in Indiana, II. Proc. Indiana Acad. Sci. 1917: 145-147. 1918.—The author lists 24 diseases on 17 hosts which have not previously been recorded for the state. (Supplementary to article by same author. Proc. Ind. Acad. Sci. 1916: 327-332. 1918.)—*H. S. Jackson.*

1023. PELTIER, GEO. L. Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus *Citrus*. Jour. Agric. Res. 14: 337-358. Aug., 1918.—See Bot. Absts. 1, Entry 924.

1024. REED, GEORGE M. Physiological specialization of parasitic fungi. Mem. Brooklyn Bot. Gard. 1: 348-409. 1918.—Critical review of the literature, mostly Uredine and Erysiphaceous, including that of bridging hosts. Bibliography of 174 titles.

1025. ROBBINS, W. W., AND G. E. EGGINGTON. Alfalfa dodder in Colorado. Colorado Agric. Exp. Sta. Bull. 248: 1-15. 1918.—Popular bulletin giving information on the prevalence of dodder in Colorado, general appearance of the parasite in the field, its life history, how it is spread, kinds of dodder infesting alfalfa in Colorado, methods of eradication, and methods of cleaning alfalfa seed to free it from dodder seed.—*W. W. Robbins.*

1026. ROSEN, H. H. Notes on some methods and terms employed in studying the Uredinales. Phytopath. 8: 581-583. 1918.

1027. ROSENBAUM, J. The origin and spread of tomato fruit rots in transit. Phytopath. 8: 572-580. fig. 1, pl. 4. 1918.—A study of various tomato fruit rots occurring on winter-grown southern tomatoes, their origin and ability to spread in transit.—With the possible exception of *Phoma* rot and leak (*Rhizopus* sp.) the tomato fruit rots originate in the field

and spread in transit from infected fruit included in the pack. Based on their ability to spread in transit from infected fruit, the tomato fruit rots are divided as follows: (1) those in which the causal fungus can spread and infect an adjacent uninjured fruit (*Phytophthora terrestris*); (2) those in which the causal organism can spread but infects fruit only through the stem end or through some break in the skin of the tomato (*Rhizoctonia* sp., *Sclerotium rolfsii*, *Rhizopus* sp.); (3) those in which the causal fungus is unable to grow through the tomato wrappers and infect healthy adjacent fruit (*Macrosporium solani*, *Phoma destructiva*, *Colletotrichum phomoides*).—J. Rosenbaum.

1028. SACKETT, WALTER G. Bacterial disease of the Wragg cherry. In Report of the Bacteriologist. Colorado Agric. Exp. Sta. Ann. Rept. 30: 20-21. 1918.—Lime-sulfur solution, self-boiled lime-sulfur and bordeaux mixture seemed to reduce the amount of disease but there was a mild case of spot and the bactericides used seemed to dwarf the fruit.

1029. SMITH, LOREN B. Spinach blight and its transmission by insects. Rept. Virginia State Entomologist and Plant Pathologist 1916-17: 40-58. Fig. 1-6. 1918.—Review of a previous paper by McClintock and the author (Jour. Agr. Res. 14: 1-59. 1918) showing the disease in question to be infectious, of unknown causation, and transmissible by aphids.—F. D. Fromme.

1030. TOBLER, F. Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung. Jahrb. wiss. Bot. 58: 1-28. Pl. 1, fig. 1-11. 1917.—See Bot. Absts. 1, Entry 1050.

1031. VANDER BIJL, P. A. Fomes applanatus (Pers) Wallr. in South Africa, and its effect on the wood of the black ironwood trees (*Olea laurifolia*). South African Jour. Sci. 14: 485. 1918.—The fungus is the main cause of the death and blowing over of large numbers of *Olea laurifolia* (black ironwood) trees in the Eastern Cape Conservancy; it is regarded as a wound parasite, and its effect on the wood is described.—E. M. Doidge.

1032. VASEY, H. E. Millet smuts and their control. Colorado Agric. Exp. Sta. Bull. 242: 1-22. 1918.—Smut is the chief disease affecting millets in the Great Plains states. Plants were infected by inoculating the seeds. Spores of both *Ustilago crameri* and *U. panici-miliacei* subjected to formaldehyde gas for a 4, 6 and 12 hours failed to germinate. Millet smut spores retain their viability at least three years. Spore dissemination in the field is effected to some extent by a beetle (*Phalacrus politus*). A solution of 1 pint of formaldehyde in 40 to 45 gallons of water is found effective in treatment.—W. W. Robbins.

1033. WORTLEY, E. J. Potato leaf-roll: its diagnosis and cause. Phytopath. 8: 507-529. Fig. 1-16. 1918.—Leaf-roll has caused from a half to a total loss of the potato crop on some farms in Bermuda. The lower leaves only are important in diagnosing the disease. The symptoms appear five to eight weeks after planting. The progeny of potatoes grown under unfavorable conditions showed largely increased percentages of leaf-roll, i.e. in drought conditions as compared with shade, in Bermuda as compared with Maine. No notable increase in leaf-roll was noted in the first crop in Bermuda from healthy seed in contrast to such cases reported by Quanjer and attributed to soil infection.—F. M. Blodgett.

1034. ZINSSMEISTER, C. L. Ramularia root-rots of ginseng. Phytopath. 8: 557-571. Fig. 1-8. 1918.—The symptoms, history, distribution, and economic importance of a root disease of ginseng, *Panax quinquefolium*, to which the popular name rust has been given, are discussed.—Isolations made from material received from two widely separated states, New York and Wisconsin, yielded in the majority of cases, species of *Ramularia*. Cultural and morphological studies of the *Ramularias* obtained show that there are two distinct species, which are designated *Ramularia destructans* and *Ramularia panacicola*. Proof of the pathogenicity of these two species is furnished as well as evidence that the disease spreads during the dormant season. Descriptions of the two species are appended. [See Bot. Absts. 1, Entry 791.]—J. Rosenbaum.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

1035. VALDIGUIÉ, M. Saffron of Kosani. Extrait du Bulletin Commerce Macédoine. [Through J. Pharm. et Chim. VII, 18: 183. 1918.] The saffron grows wild in Asia minor, in Persia and also in Greece, where it is especially cultivated in the region of Kosani, south and south west of Macedonia on a large plain, 700 meters high, where the temperature never is lower than 5°C. General descriptive data of the plants and the flowers are given and the statement is made that the material resembles French saffron closely and that it is largely exported to France and sold there as French (Gâtinais) saffron.—Arno Viehoever.

1036. VAN ITALLIE, L., AND H. J. LEMKES. Analysis of Styrax. Pharm. Weekblad 55: 141-149. [Through J. Pharm. et Chim. VII, 18: 181. 1918.]—The origin, main characteristics of Styrax and important analytical data are discussed, including especially the procedure for the quantitative determination of cinnamic acid. The amount of this acid present in 9 samples varied from 0 to 35.2 per cent. The saponification number does not indicate the amount of cinnamic acid present. Heated on the steambath, styrax should not develop any odor of oil of turpentine.—Arno Viehoever.

1037. VAN ITALLIE, L. Chemical composition of *Empetrum nigrum*. Pharm. Weekbl. 55: 709-718. [Through J. Pharm. et Chim. VII, 18: 180. 1918.] The leaves contain a wax (largely a ceryl compound), benzoic acid, tannin, fructose, urson and probably rutin. Urson in its anhydric form has the formula $C_{10}H_{16}O$ and is identical with the urson found in the leaves of the "Red Bear Berry" (*Uva ursi*) and other Ericaceae. *Empetrum nigrum* contains no alkaloids nor andromedotoxin or glucosides decomposed by emulsin. The presence of benzoic acid and urson, both found in several ericaceae, makes it probable that the empetraceae belong to the ericaceae, a suggestion already previously expressed by M. Hallier on the basis of their external and internal structure.—Arno Viehoever.

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

MOSESSES

1038. DIXON, H. N. *Swartzia montana* Lindb. in Surrey. Jour. Bot. 56: 155-156. 1918.—A note of an isolated new station for this moss.—A. Le Roy Andrews.

1039. DIXON, H. N. *Hypnum falcatum* (Brid.) var. nov. *delicatum* Dixon. Jour. Bot. 56: 360. 1918.—A variant form from Dartmoor, England, collected by Mr. G. T. Harris is described under the above varietal name.—A. Le Roy Andrews.

1040. HESSELBO, AUG. The Bryophyta of Iceland. In: ROSENVIINGE & WARMING. The botany of Iceland 1: 395-677. 1918.—On the basis of material gathered by himself and what was available of earlier collections the author lists 93 species of hepatics, 20 of *Sphagnum* and 324 (with 2 subspecies 326) of true mosses, including two new species of *Bryum* and one of *Brachythecium*. Under each species are included notes on distribution and habitat, and at the close the general ecological aspects are discussed, particularly as to the bryophytic vegetation about the various hot springs. The work is illustrated by a number of photographs.—A. Le Roy Andrews.

1041. HURST, C. P. *Philonotis caespitosa* var. *adpressa* Dismier in Britain. Jour. Bot. 56: 250. 1918.—A note of the occurrence of this variety near Burridge Heath, Great Bedwyn, South Wiltshire.—A. Le Roy Andrews.

1042. LUISIER, A. Fragments de bryologie ibérique. *Broteria* 16: 123-142. 1918.—After a brief outline of previous publications, the author gives a list of all species of mosses thus far reported from the ancient province of Galicia, Spain, followed by a more detailed list of those species which are additions to the published flora. Critical notes accompany many of the species in the latter list, and a new variety each of *Fissidens* and of *Pohlia* is described.—E. B. Chamberlain.

1043. MACHADO, ANTONIO. Apontamentos briológicos. *Broteria* 16: 97-103. 1918.—The author gives critical notes, and cites localities for twenty species of mosses and four of hepatics which are either new or rare in the Portuguese flora. A new variety of *Fissidens* and one of *Rhynchostegium* are described.—E. B. Chamberlain.

1044. POTIER DE LA VARDE, R. Sur trois mousses inédites de la Chine orientale. *Rev. Gén. Bot.* 30: 346-354. 1918.—From the herbarium of the late Gen. Paris a collection of mosses made by R. P. Courtois in China in 1910 is listed. It comprises 22 species, 3 being described and figured as new, one each in *Macromitrium*, *Pylaisia*, and *Gollania*.—A. Le Roy Andrews.

1045. WHELDON, J. A. *Drepanocladus aduncus* (Hedw.) var. *Wheldoni* Ren. in N. Somers. *Jour. Bot.* 56: 273. 1918.—This variety was found by Mr. C. P. Hurst on the Burnham sandhills, opposite Berrow Church.—A. Le Roy Andrews.

LIVERWORTS

1046. CAMPBELL, D. H. Studies on some East Indian Hepaticae. *Ann. Bot.* 32: 319-338. Pl. 8-9, fig. 1-10. 1918.

1047. DOVIN, CH. AND R. Le *Reboulia* Raddi. *Rev. Gén. Bot.* 30: 129-145. Fig. 1-15. 1918.—According to most recent students of the Hepaticae the genus *Reboulia* is composed of a single variable and widely distributed species, *R. hemisphaerica* (L.) Raddi. The authors, on the basis of careful cultures, express the opinion that this species is an aggregate and separate from it, as new species, *R. occidentalis* of western Europe and *R. Charrieri* of the Mediterranean region. The specific characters relied upon are derived especially from the size and surface-markings of the spores, the form of the female receptacle, and the position of the male receptacle, which in all three species is in the form of a sessile disc. This disc is originally median and retains this position in *R. hemisphaerica*; in the other two species it becomes split into two by the subsequent growth of the male branch, the halves becoming displaced laterally and appearing marginal. In comparing the female receptacles of *Reboulia* with those of other genera of the Marchantiaceae the authors split off the new genus *Marchantiopsis* for the reception of *Marchantia geminata*, *M. Treubii*, etc. In the new genus the groups of archegonia are situated underneath the lobes, and the receptacles do not develop the conspicuous sterile rays between the groups, which constitutes a striking feature in *M. polymorpha* and the other typical species of *Marchantia*.—A. W. Evans.

1048. HESSELBO, AUG. The Bryophyta of Iceland. In: ROSENVINGE & WARMING. The botany of Iceland 1: 395-677. 1918.—See Bot. Absts. 1, Entry 1040.

1049. MACHADO, ANTÓNIO. Apontamentos briológicos. *Broteria* 16: 97-103. 1918.—See Bot. Absts. 1, Entry 1043.

ALGAE

1050. TOBLER, F. Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung. *Jahrb. f. wiss. Bot.* 58: 1-28. Pl. 1, fig. 1-11. 1917.—*Phyllosiphon asteriforme* is described as a new parasitic and endophytic siphonaceous alga on the leaves of *Zamioculcaezamiifoliae* Lodd. in German East Africa. The alga, while chlorophyll bearing, is strictly parasitic and causes in most cases a marked gall formation. Affinities of the new organism with other Phyllosiphonaceae are discussed.

1051. WOLFE, JAMES J. Alternation and parthenogenesis in *Padina*. Jour. Elisha Mitchell Sci. Soc. 34: 78-109. 1918.—See Bot. Absts. 1, Entry 983.

FUNGI

1052. BLAGAIC-ZAGREB, K. *Boletus conglobatus*, eine neue Species. Hedwigia 60: 10-11. 1918.—The species is described from Croatia.

1053. HENDERSON, M. P. The black-leg disease of cabbage caused by *Phoma lingam* (Tode) Desmaz. Phytopath. 8: 379-431. Fig. 1-10. 1918.—The data presented indicate that *Phoma siliquastrum* Desmaz., *Aposphaeria brassicae* Thüm., *Phoma oleracea* Sacc., *Phoma brassicae* Thüm., and probably also *Phoma napobrassicae* Rostr. are merely other names applied to this same fungus as it occurred under varying conditions. The fungus occurring on *Melilotus alba* and designated as *Phoma oleracea* Sacc. does not produce infection when inoculated into cabbage, and should be otherwise designated. Inoculations show that at least twenty-two members of the Cruciferae are hosts of *Phoma lingam*. [See Bot. Absts. 1, Entry 316.]—H. M. Fitzpatrick.

1054. KULKARNI, G. S. Smuts of jowar (sorghum) in the Bombay Presidency. Bull. Agric. Res. Inst. Pusa 78: 1-26. Pl. 1-6. 1918.—Four species are listed as occurring on sorghum, one of them reported for the first time from India.

1055. LLOYD, C. G. Mycological notes, no. 53. P. 750-764. Feb., 1918. [Cincinnati, Ohio.]—*Polyporus rusticus* received from S. Africa described as new. *Stropharia tuberosa* n. sp., described here by H. C. Beardslee, arises from a black sclerotium. Photographs and notes on "rare or interesting fungi received from correspondents" include the following: *Hydnum fimbriatum*, *Clathrus camerunensis*, *Polyporus rheades*, *Sebacina amesii*, *Catalstoma ater*, *Isaria byssoidea*, *Tremella marmorata*, *Polystictus cryptomeniae*, *Polyporus vanderystii*, *Trametes unguolata*, *Scleroderma columnare*, *Polystictus stereoides*, *Cantharellus clavatus*, *Lenzites subferruginea*, *Polyporus grantii*, *Stereum liratum*, *Cyttaria gunnii*, *Lysurus sinensis*, *Polystictus cuneatus*.—H. M. Fitzpatrick.

1056. PASCHER, ADOLF. *Asterocystis* de Wildeman und *Asterocystis* Gobi. Beih. Bot. Centralbl. 35: 578-579. 1917.—The name *Asterocystis* was given by Gobi in 1879 to an alga with affinities apparently with the Glaucophyceae. The same name was used by de Wildeman in 1893 for a member of the Olpidiaceae. The author suggests that the name in the sense of de Wildeman be dropped and proposes the generic name *Olpidiaster* instead. *Olpidiaster radici* Pascher (*Asterocystis radici* de Wildeman) therefore appears as a new name.

1057. ZELLER, S. M. Fungi found on *Codium mucronatum*. Pub. Puget Sound Biol. Sta. 2: 121-125. Pl. 20. 1918.—Three new species of marine fungi are described from Friday Harbor, State of Washington. Of these *Chytridium codicola* and *Rhizophidium codicola* are Phycomycetes belonging to the family Chytridiaceae, and *Stemphylium Codii* is a Hyphomycete belonging to the family Dematiaceae.—T. C. Frye.

LICHENS

1058. BURNHAM, S. H. Lichens of the Berkshire Hills, Massachusetts. Bryologist 21: 29-32. 1918.—The author lists 55 species and varieties from Mt. Greylock, and 22 from other parts of the Berkshires.—L. W. Riddle.

1059. DURFEE, T. Lichens of the Mt. Monadnock region, N. H. X.—Bryologist 21: 18. 1918.

1060. FINK, B. A new genus and species of the Collemaceae. Mycologia 10: 235-238. Pl. 13. 1918.—The author describes *Collemodes*, new genus, with *C. Bachmanianum*, new species, as the type, to be distinguished from *Collema pulposum* (Bern.) Ach. by differences in the sexual reproductive organs.—L. W. Riddle.

1061. RIDDLE, L. W. Report on the lichens of St. Thomas and St. John. In: N. L. Britton, The flora of the American Virgin Islands. Mem. Brooklyn Bot. Gard. 1: 109—115. 3 fig. 1918.—Seventy species are listed, with one new species each in the genera *Opegrapha*, *Lecania*, and *Blastenia*; a new variety of *Leptogium marginellum* (Sw.) Mont.; and new combinations of *Caloplaca*, *Buellia*, and *Graphina*. [See Bot. Absts. 1, Entry 1077.]—L. W. Riddle.

1062. RIDDLE, L. W. [Chapter on the Lichens.] In: N. L. Britton, The flora of Bermuda. Pp. 470—479. Scribner, New York, 1918.

1063. RIDDLE, L. W. Some extensions of ranges. Bryologist 21: 50. 1918.—New stations are recorded for four interesting species of lichens, one, *Dirina repanda* (Fr.) Nyl., being new to North America.—L. W. Riddle.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

Unsigned abstracts are by the editor.]

1064. ASHE, W. W. Notes on *Betula*. Rhodora 20: 63—64. 1918. *Betula lenta* var. *uber*, a new variety, is described from Virginia.

1065. ASHE, W. W. Notes on southern woody plants. Torreyia 18: 71—74. 1918.—*Vaccinium Margarettae* Ashe is described as a new species from Georgia and South Carolina. New combinations are made in *Quercus* and in *Carya*.

1066. BAKER, EDMUND G. The Sumatran species of *Saurauja*. Jour. Bot. 56: 161—167. 1918.—The author recognizes twenty-five species of this genus from Sumatra, and of this number six species and two varieties are new to science.

1067. BATES, J. M. A new *Kochia*. Amer. Bot. 24: 51, 52. 1918.—The author characterizes a new species of *Kochia* (*K. alata*) from Nebraska.

1068. BICKNELL, E. P. The ferns and flowering plants of Nantucket. XIX. Bull. Torr. Bot. Club 45: 365—383. 1918.—This article contains supplementary notes on several species previously mentioned in the series; *Quercus prinoides* var. *rufescens* Rehder is raised to specific rank.

1069. BLAKE, S. F. On the names of some species of *Viburnum*. Rhodora 20: 11—15. 1918.—Blake finds that the plant known for many years as *Viburnum pubescens* auth., not Pursh, should take the name *Viburnum affine* Bush of which he recognizes two varieties namely, var. *affine* (typical form) and var. *hypomalacum* (a new variety). Two new combinations are recorded under *Viburnum pubescens* (Ait.) Pursh namely, *V. pubescens* (Ait.) Pursh var. *Canbyi* (Rehder) Blake, and *V. pubescens* (Ait.) Pursh var. *longifolium* (Dippel) Blake.

1070. BLAKE, S. F. *Lycopodium sabinaefolium* var. *sharonense*. Rhodora 20: 60. 1918.—Record is made of a new combination namely, *Lycopodium sabinaefolium* Willd. var. *sharonense* Blake.

1071. BLAKE, SIDNEY. Notes on the Clayton herbarium. Rhodora 20: 21—28, 48—54, 65—73. Figs. 1—8. 1918.—From studies made of specimens in the Clayton herbarium, now at the British Museum, the author has found it necessary to make several nomenclatorial changes of American flowering plants. These changes concern the following genera: *Eleocharis*, *Fimbristylis*, *Rynchospora*, *Dioscorea*, *Helianthemum*, *Oenothera*, *Thaspium*, *Gratiola*, *Agalinis*, and *Gnaphalium*.

1072. BLAKE, S. F. A variety of *Smilax glauca*. *Rhodora* 20: 78-80. 1918.—The author describes two varieties of *Smilax glauca* Walt. namely, var. *genuina* and var. *leuophylla*.

1073. BLAKE, S. F. Note on the proper name for the Sassafras. *Rhodora* 20: 98-99. 1918.—Blake finds that the correct name for this well known plant is *Sassafras officinale* Nees & Eberm. The nearly glabrous and more or less glaucous form of this species is designated as var. *albidum* (Nutt.) Blake.

1074. BLAKE, S. F. Notes on the flora of New Brunswick. *Rhodora* 20: 101-107. 1918.—The author records a list of the plants collected in 1913 on the coastal sands of New Brunswick and adjacent small islands. A new hybrid is described as *Juncus alpinus* var. *insignis* \times *brevicaudatus* Blake.

1075. BRITTON, N. L. An undescribed *Scirpus* from California. *Torreyia* 18: 36. Fig. 1. 1918.—*Scirpus Congdoni* Britton is described and illustrated as a new species.

1076. BRITTON, N. L. The relatives of *Catalpa* trees in the West Indies. *Jour. New York Bot. Gard.* 19: 6-9. Pl. 209. 1918.—Author discusses a small group of trees or shrubs of the West Indies, which have been known hitherto either under the name of *Catalpa* or *Bignonia*. For these relatives of the typical *Catalpa* he has raised the sectional name *Macrocatappa* of Grisebach to generic rank and includes three species namely, *M. longissima*, *M. punctata*, and *M. purpurea*.

1077. BRITTON, N. L. The flora of the American Virgin Islands. *Brooklyn Bot. Gard. Mem.* 1: 19-118. 1918. [Contrib. N. Y. Bot. Gard. No. 203.]—The present flora concerns primarily the islands of St. Thomas, St. Jan, and St. Croix. The number of species recorded for these islands, exclusive of the fungi and algae, is 1052, which are distributed among the following groups: spermatophytes 890, pteridophytes 41, bryophytes 46, and lichens 75. The following new species and varieties are described: *Opuntia antillana* Britton & Rose, *Opegrapha acicularis* Riddle, *Lecania euthallina* Riddle, *Blastenia nigrocincta*, and *Leptogium marginellum* var. *isidiosellum* Riddle. Several new combinations are also included. [See Bot. Absts. 1, Entry 1061.]

1078. BURKILL, I. H. A new *Dendrobium*, *D. gracilipes*, from the Rhio Archipelago. *Jour. Straits Branch R. A. Soc.* No. 79: 45-46. 1918.—*Dendrobium* (*Sarcopodium*) *gracilipes* is described and figured.

1079. BURKILL, I. H. *Begonia Haniffii*, a small tuberous species of the Islands of Lankawi. *Jour. Straits Branch R. A. Soc.* No. 79: 103-104. 1918. *Begonia Haniffii*, a new species, is described and figured.

1080. CAÑIZARES, FELIPE GARCIA. El Jardín Botánico del Instituto de segunda Enseñanza de la Habana. *Roy. 8vo*, 169 p., pl. I-VI (garden plans). Havana, 1918.—The author gives a historical account of the Botanical Garden in Havana, followed by a catalogue of the indigenous and exotic plants growing in the Garden. Both scientific and common names of plants are listed, and several species are illustrated by photographic reproductions.

1081. COCKERELL, T. D. A. A new hybrid sunflower. *Torreyia* 18: 11-14. 1918.—*Helianthus annuus* \times *petiolaris* is described as a new hybrid, grown under control conditions. [See Bot. Absts. 1, Entry 15.]

1082. FERNALD, M. L. American variations of *Epilobium*, section *Chamaenerion*. *Rhodora* 20: 1-10. 1918.—The numerous variations of *Epilobium angustifolium* L. are reduced by the author to forma *albiflorum*, forma *spectabile*, var. *macrophyllum*, var. *intermedium*, and var. *platyphyllum*. A discussion on the supposed hybridization between *Epilobium angustifolium* and *E. latifolium* is also presented.

1083. FERNALD, M. L. Some American *Epilobiums* of the section *Lysimachion*. *Rhodora* 20: 29-39. 1918.—*Epilobium densum* Raf., var. *nesophilum* Fernald is described as a new variety from Newfoundland and the Magdalen Islands, and *E. molle* Torr., var. *sabulonense* Fernald, also a new variety, from Sable Island off Nova Scotia. *Epilobium glandulosum* Lehm. and *E. adenocaulon* Haussk. are discussed in detail and treated as conspecific; and six varieties are characterized under *E. glandulosum*. A new species, *Epilobium Steckerianum*, is recorded from Labrador.

1084. FERNALD, M. L. The North American *Littorella*. *Rhodora* 20: 61-62. 1918.—The American plant hitherto known as *Littorella uniflora* is shown to be specifically distinct from *L. uniflora* (L.) Asch. of Europe, and to it is given the name *Littorella americana* Fernald.

1085. FERNALD, M. L. The validity of *Oxalis americana*. *Rhodora* 20: 76-78. 1918.—Fernald points out that the American plant commonly known as *Oxalis Acetosella* should take the name *O. americana* Bigelow, and describes the pink-flowered form of this species as *rhodantha*.

1086. FERNALD, M. L. *Rosa blanda* and its allies of northern Maine and adjacent Canada. *Rhodora* 20: 90-96. 1918.—The writer discusses *Rosa blanda* Ait. and its near relatives and includes descriptions of two new species namely *Rosa johannensis* with its white flowered form *albina* from the St. John Valley, and *Rosa Williamsii* from Quebec.

1087. FERNALD, M. L., AND K. M. WIEGAND. Some new species and varieties of *Poa* from North America. *Rhodora* 20: 122-127. 1918.—The authors have published the following new species and variety of *Poa*: *P. saluensis*, its variety *microlepis*, and *P. paludigena*.

1088. FERNALD, M. L. The American representations of *Equisetum sylvaticum*. *Rhodora* 20: 129-131. 1918.—The author describes a new form of the above species namely, var. *pauciramosum*, forma *multiramosum* Fernald.

1089. FERNALD, M. L. Some allies of *Rynchospora macrostachya*. *Rhodora* 20: 138-140. 1918.—Fernald discusses the detailed characters of *Rynchospora macrostachya* Torr. and *R. corniculata* (Lam.) Gray, raises *R. macrostachya*, var. *inundata* Fernald and *R. macrostachya*, var. *patula* Chapm. to specific rank (renaming the latter as *Rynchospora Careyana* Fernald), and describes a new variety namely, *R. corniculata* (Lam.) Gray, var. *interior* Fernald, which ranges in distribution from Alabama to Texas, Arkansas, and Indiana.

1090. FERNALD, M. L. The specific identity of *Bidens hyperborea* and *B. colpophila*. *Rhodora* 20: 146-150. 1918.—The author concludes that *Bidens colpophila* Fernald & St. John is conspecific with *B. hyperborea* Greene, and differentiates three varieties of the latter namely, *colpophila*, *cathancensis*, and *gaspensis*.

1091. FERNALD, M. L. *Carex paupercula*, var. *brevisquama*, n. var. *Rhodora* 20: 152. 1918.—This new variety of sedge is described from material collected in Charlevoix County, Quebec.

1092. FOXWORTHY, F. W. Philippine Dipterocarpaceae. II. *Philip. Jour. Sci. Bot.* 13: 163-199. *Pl. 1, 2*. 1918.—The author presents a revision of the Dipterocarpaceae of the Philippine Islands, recognizing nine genera and seventy species of which seventeen are described as new to science.

1093. GATES, R. RUGGLES. A systematic study of the North American Melanthaceae from the genetic standpoint. *Jour. Linn. Soc. Bot.* 44: 131-172. *Pl. 5*. 1918.—The title of this paper is aptly chosen to indicate the point of view from which the study was approached. The author makes no pretence to an exhaustive taxonomic treatment of the Melanthaceae but rather presents a general survey of a relatively compact group of genera (about twenty) based primarily on characters arising from definite and often discontinuous variation, par-

ticularly with reference to the genesis and relationships of the different generic elements included. Several new combinations occur in the text.

1094. GREENMAN, J. M. Monograph of the North and Central American species of the genus *Senecio*. Part II. Ann. Missouri Bot. Gard. 5: 37-107. Pl. 4-6. 1918.—The present installment treats the section *Tomentosi* Rydb. which comprises thirty-five species and several varieties. Two new species *Senecio Muirii* from California and *S. molinarius* from Colorado, are proposed, and a few new varieties, new combinations, and new names are included.

1095. GREENMAN, J. M., AND NORMA E. PFEIFFER. A new *Selaginella* from Mexico. Ann. Missouri Bot. Gard. 5: 205-210. Pl. 11-12. 1918.—A new species of the *Selaginella rupestris* group, *S. Landii*, is described from the granite boulders of the San Estaban Mountains in the State of Jalisco, Mexico, and dedicated to its collector.—Norma E. Pfeiffer.

1096. HENRY, J. K. A new variety of *Rubus parviflorus*. Torreya 18: 54-55. Fig. 1. 1918.—*Rubus parviflorus* Nutt. var. *Fraserianus* Henry is illustrated and described as a new species from Vancouver Island.

1097. JOHNSTON, I. M. Some undescribed plants from southern California. Bull. S. California Acad. Sci. 17: 63-66. 1918.—The author describes a new species of *Lupinus* (*L. elatus*), four new varieties in different genera, and places on record distributional notes on plants of southern California.

1098. KOORDERS, S. H. Botanisch overzicht der Rafflesiaceae van Nederlandsch-Indië. Met determinatietabellen en soortbeschrijvingen, hoofdzakelijk naar Solms-Laubach. *Svo. vi + 128 p., 19 pl., and Nieuwe Addenda 124^{ts}, 124^{ts}*. G. Kolff & Co., Batavia, May, 1918.—A general consideration of the Rafflesiaceae of the Indo-Malayan region including the Philippines, accompanied by a full bibliography, keys to genera and species, and descriptions. Thirteen species of *Rafflesia* are recognized including the following new ones: *Rafflesia borneensis* Koord., Borneo, *R. Witkampii* Koord., Borneo, *R. ciliata* Koord., Borneo, *R. zollingeriana* Koord., Java, and *R. atjehensis* Koord., northern Sumatra, with four additional ones which the author could determine only to the genus, and which are apparently new species. The other genera considered as *Brugmansia* with two species, *Richthofenia*, one species, and *Sapria*, one species. The photographic reproductions of *Rafflesia Arnoldii* R. Br. from the type locality (Bencolen, Sumatra) are especially good.—Elmer D. Merrill.

1099. MACBRIDE, J. FRANCIS. A new species of Bladdernut. *Rhodora* 20: 127-129. 1918.—*Staphylea Brighamii* Macbride is described. The type was collected near Toledo, Ohio.

1100. MACBRIDE, J. FRANCIS. A new *Perezia* adventive in Massachusetts. *Rhodora* 20: 150-152. 1918.—*Perezia aletes* Macbride is described as a new species. The plant was introduced into New England through seed in wool brought from South America.

1101. MACCAUGHEY, VAUGHAN. The Hawaiian Violaceae. Torreya 18: 1-11. 1918.—Eleven species and varieties of *Viola* and three species of *Isodendrion* are enumerated from the Hawaiian Islands. A compiled description is given of each species and variety.

1102. MACCAUGHEY, VAUGHAN. The genus *Gleichenia* (Dicranopteris) in the Hawaiian Islands. Torreya 18: 41-52. 1918.—Four species of *Gleichenia* are recognized from Hawaii; a description and notes are given of each species.

1103. MARSHALL, E. S. Three apparently undescribed Irish Saxifrages. Jour. Bot. 56: 65-67. 1918.—One new species of *Saxifraga* and two new varieties are described from Ireland.

1104. MAXON, WILLIAM R. A new *Polystichum* from California. Jour. Washington Acad. Sci. 8: 620-622. 1918.—*Polystichum Dudleyi* is described from the Santa Cruz peninsula. The species is named in honor of the late Professor William R. Dudley.

1105. MAXON, WILLIAM R. The lip-ferns of the southwestern United States related to *Cheilanthes myriophylla*. Proc. Biol. Soc. Washington 31: 139-152. 1918.—The author concludes that *Cheilanthes myriophylla* is an andine species extending from northern Mexico to Bolivia and Argentina, but does not occur in the United States. Under the above title five species and one subspecies are treated in detail, and of these the following are new: *Cheilanthes Wootoni*, *C. Covillei*, and *C. Covillei* subsp. *intertexta*.

1106. MERRILL, E. D. The Bornean species of *Eugenia*, *Schefflera*, and *Saurauia*, represented in the Singapore Herbarium. Jour. Straits Branch R. A. Soc. No. 79: 19-35. 1918.—Twenty-three species of *Eugenia* are recorded from Borneo, and of this number *E. Kingii*, *E. monantha*, *E. subracemosa*, *E. subsessilifolia*, *E. lunduensis*, and *E. rhynchophylla* are published as new. To the six species of *Schefflera* hitherto known from Borneo, the following are added and described as new: *Schefflera borneensis*, *S. Burkillii*, *S. Havilandii*, and *S. racemosa*. Nine species of *Saurauia* are listed of which the following are described and indicated as new: *Saurauia glabra*, *S. spinulosetosa*, *S. Ridleyi*, and *S. Havilandii*. *Saurauia oblanceifolia* Merrill, a new specific name, is given to *S. oblanceolata* Merrill, not Ridley.

1107. MERRILL, E. D. New or noteworthy Philippine plants. XIII. Philip. Jour. Sci. Bot. 13: 1-66. 1918.—The present paper, like the preceding ones in this series, is devoted primarily to the description of new species. Those here proposed are: *Alocasia Wenzelii*, *A. maquilangensis*, *Aneilema humile*, *Smilax erecta*, *S. lucida*, *Quercus cagayanensis*, *Q. Mabesae*, *Elatostema gracilifolium*, *Aristolochia humilis*, *Cocculus sarmentosus* (Lour.) Diels, var. *stenophyllum*, *Michelia platyphylla*, *Matthaea intermedia*, *Capparis longipes*, *C. ilocana*, *Rubus Edanoi*, *Connarus subfoveolatus*, *Albizia magaladenia*, *Neptunia depauperata*, *Spatholobus philippinensis*, *Evodia glaberrima*, *Tetractomia pachyphylla*, *Hippocratea megalocarpa*, *H. trichopetala*, *Salacia euphlebia*, *S. Wenzelii*, *Nephelium Schneideri*, *Orthophora cauliflora*, *Ventilago brunnea*, *Tetrastigma corniculatum*, *Elaeocarpus bontocensis*, *E. surigaensis*, *Abelmoschus Vanoverberghii*, *Sida longistipula*, *Saurauia Alvarezii*, *S. bicolor*, *S. glabrifolia*, *Casearia euphlebia*, *C. confertiflora*, *Homalium multiflorum*, *H. platyphyllum*, *H. villosum*, *Begonia Castilloi*, *B. tayabensis*, *B. apayaoensis*, *B. binuangensis*, *B. caudata*, *Mastixia tetrapetala*, *M. subcaudata*, *Boerlagiodendron Yatesii*, *B. Fenicis*, *B. tayabense*, *Diospyros Velascoi*, *D. tayabensis*, *Bassia cagayanensis*, *Ardisia nigromaculata*, *A. rivularis*, *Fragraea Curranii*, *F. Macgregorii*, *Alyxia revoluta*, *A. glabra*, *A. lanceolata*, *A. laxiflora*, *Kopsia laxinervia*, *Erycibe Sargentii*, *Callicarpa platyphylla*, *Solanum luzoniense*, *S. luzoniense* var. *glabrum*, *Hemigraphe viridis*, *H. hirsutissima*, *H. pauciflora*, *Justicia dispar*, *Lepidagathis microphylla*, and *Alsomitra pubescens*. A new genus, *Ilocania* of the Cucurbitaceae, is described with a single species, *I. pedata*, from the island of Luzon.

1108. MERRILL, E. D. Species Blancoanae. A critical revision of the Philippine species of plants described by Blanco and by Llanos. Bur. Sci. Publ. No. 12. 412 p., 1 folded map. Manila [P. I.], 1918.—This work is concerned primarily with an enumeration of the species of Blanco's *Flora de Filipinas* and an interpretation of those species in the light of present knowledge of the Philippine flora. Opposite each Blancoan plant-name listed is given the name with which it is regarded by the author as synonymous. The text is amplified by copious annotations. Several sets of carefully prepared exsiccata have been distributed to leading herbaria; these specimens amply illustrate the author's interpretation, and make the work "Species Blancoanae" of practical value to the student of the Philippine flora.

1109. MERRILL, E. D. New species of Bornean plants. Philip. Jour. Sci. Bot. 13: 67-122. 1918.—This paper is the third of a series dealing with the Bornean flora and contains descriptions of sixty-one new species in the families Magnoliaceae, Connaraceae, Leguminosae, Rutaceae, Meliaceae, Euphorbiaceae, Sterculiaceae, Dilleniaceae, Passifloraceae, Flacourtiaceae, Myrtaceae, Araliaceae, Clethraceae, Myrsinaceae, Oleaceae, Gentianaceae, Asclepiadaceae, and Rubiaceae.

1110. MERRILL, E. D. Notes on the flora of Loh Fau Mountain, Kwangtung Province, China. *Philip. Jour. Sci. Bot.* 13: 123-161. 1918.—The author lists several genera and fifty-three species not hitherto recorded from Kwantung Province. Twenty-four species are described as new.

1111. MOORE, SPENCER LE M. *Alabastra diversa*. Part XXVIII. *Jour. Bot.* 56: 4-11, 36-40. 1918.—These studies are based on collections made in Africa by Archdeacon Rogers. Nineteen new species and one new variety of flowering plants are described, distributed among several genera.

1112. MOORE, SPENCER LE M. *Alabastra diversa*. Part XXIX. *Jour. Bot.* 56: 204-212, 225-233. 1918.—The author describes twenty-eight new species of Compositae from Africa, including a new genus, *Emiliella*, of the Senecionideae. One new species of *Jatropha* from Brazil is also characterized.

1113. MOSHER, EDNA. The grasses of Illinois. Univ. Illinois Agric. Exp. Sta. Bull. 205: 261-425. 287 fig. 1918.—The aim of the author in this work has been to list all species of grasses known to occur in the state of Illinois. A key to the genera precedes the enumeration of species. Each species is described briefly, and the description is followed by a note on distribution and a paragraph containing citations of *exsiccata*. A limited synonymy and a very abbreviated bibliography are included. Sixty-three genera represented by two hundred and four species are listed in the publication.

1114. NELSON, A., AND J. FRANCIS MACBRIDE. Western plant studies. V. *Bot. Gaz.* 65: 58-70. 1918.—This paper contains a partial synopsis of northwestern members of the genus *Clarkia*; a new clover, *Trifolium Leibergii*; a new gentian, *Gentiana Covillei*; a new species of *Pentstemon* namely, *P. Albrightii* A. Nels.; new specific names as follows: *Allium scissum* (A. *incisum* Nels. & Macbr., not Fomine), *Clarkia superba* (*Godetia grandiflora* Lindl., not *Clarkia grandiflora* (F. & M.) Greene), *Tonestus eximius* (*Haplopappus eximius* Hall), *Prenanthes hastata* (*Sonchus hastata* Less.); and the following new combinations: *Sisyrinchium boreale* (*Hydastylus borealis* Bickn.), *Brodiaea coronaria* (*Hookera coronaria* Salisb.), *Clarkia delicata* (*Godetia delicata* Abrams), *C. biloba* (*Oenothera biloba* Durand), *C. epilobioides* (*Oenothera epilobioides* Nutt.), *C. Whitneyi* (*Oenothera Whitneyi* Gray), *C. amoena* (*Oenothera amoena* Lehm.), *C. amoena* forma *concolor* (*Godetia amoena* var. *concolor* Jepson), *C. amoena* forma *Lindleyi* (*Oenothera Lindleyi* Dougl.), *C. arcuata* (*Oenothera arcuata* Kell.), *C. caurina* (*Godetia caurina* Abrams), *C. Romanzovii* (*Oenothera Romanzovii* Ledeb.), *C. gracilis* (*Godetia gracilis* Piper), *A. quadrivulnera* (*Oenothera quadrivulnera* Dougl.), *C. viminea* (*Oenothera viminea* Dougl.), *C. purpurea* (*Oenothera purpurea* (Curtis) Bot. Mag. pl. 352), *K. Arnottii* (*Oenothera Arnottii* T. & G.), *C. decumbens* (*Godetia decumbens* Dougl.), *Nemophila pedunculata* Dougl. var. *sepulta* (*N. sepulta* Parish), *N. pedunculata* Dougl. var. *densa* (*N. densa* Howell), *N. heterophylla* F. & M. var. *tenera* (*N. tenera* Eastw.), *Pentstemon pandus* (*P. perpulcher* var. *pandus* Nels.), and *Castilleja miniata* Dougl. var. *Dixonii* (*C. Dixonii* Fernald).

1115. NELSON, J. C. Additions to the flora of western Oregon. *Torreyia* 18: 21-35. 1918.—One hundred and fifty-three species of flowering plants are here listed as having been collected within the Oregon limits of Piper and Beattie's "Flora of the Northwest Coast," but not mentioned in that work. About sixty per cent. of this number, however, are said to be introduced. A second list of forty-five species of flowering plants is given, showing extension in hitherto recorded geographical range.

1116. OSTERHOUT, GEO. E. A new *Hymenopappus* from Colorado. *Torreyia* 18: 90. 1918.—*Hymenopappus polycephalus* Osterhout is described as a new species.

1117. PARISH, S. B. Notes on some southern California plants. *Bot. Gaz.* 65: 334-343. 1918.—Parish records several species not hitherto reported from California, also several ad-

ditions to the known flora of the southern counties of the state. One new variety of clover, *Trifolium gracilentum* var. *reductum* Parish is described from Pilot Knob, Mojave Desert.

1118. PAULSEN, OVE. A new *Cereus* from the West Indies. Jour. Bot. 56: 235. 1918.—*Cereus venditus* is described as a species new to science, based on collections made by Eug. Warming on the island of St. Jan.

1119. PAYSON, EDWIN BLAKE. The North American species of *Aquilegia*. Contrib. U. S. Nation. Herb. 20: 133-157. Pls. 8-14. 1918.—The author finds that flower-structure presents the most constant differences and is of the highest value taxonomically. The genus embraces twenty-five species in North America; these are grouped in three sections namely, *Cyrtoplectrae*, *Rhodanthae*, and *Microplectrae*. The first section, typified by *Aquilegia saximontana*, represents the most primitive and probable ancestral type of the genus, and the *Macroplectrae*, typified by *A. longissima*, the most highly specialized and perhaps the most recent development. The comparative floral structure and phylogenetic relationship are graphically shown in a full-page illustration. The following new species are described: *Aquilegia lithophila*, *A. triternata*, *A. wawawensis*, *A. formosa* subsp. *dissecta*, and *A. formosa* subsp. *caelifax*. Three new combinations are included.

1120. PITTIER, HENRY. New or noteworthy plants from Colombia and Central America. 7. Contrib. U. S. Nation. Herb. 20: x + 95-132. 1918.—The author includes descriptions of upwards of thirty new species of flowering plants, belonging mostly to the Leguminosae. Several of the older and incompletely characterized species are redescribed in the light of recently acquired and more complete specimens.

1121. PRAEGER, R. LLOYD. Notes on *Sedum*. II. Jour. Bot. 56: 149-152. 1918.—In continuation of his studies on the genus *Sedum* the author describes two new species, *S. floriferum* from Wei-hai-Wei, China, and *S. Taquetii* from Korea, and two new varieties of probable Japanese origin.

1122. RIDLEY, H. N. *Hoseanthus* Merrill, n. gen. Jour. Straits Branch R. A. Soc. No. 79: 19. 1918.—The author reinstates *Hosea* Ridley a genus of the Verbenaceae, on the ground that the earlier *Hosea* Dennstedt was a *nomen nudum*, thus reducing *Hoseanthus* Merrill to synonymy.

1123. RIDLEY, H. N. New and rare Malayan Plants. Series X. Jour. Straits Branch R. A. Soc. No. 75: 63-100. 1918.—This article consists mainly of the descriptions of new species a list of which follows: *Sterculia brachycarpa*, *Eugenia limnoea*, *E. pauper*, *E. cyrtophylloides*, *E. Klossii*, *E. cordifoliata*, *Melastoma scabrum*, *Osbeckia perakensis*, *Allomorpha malaccensis*, *Sonerila patula*, *S. belluta*, *S. setosa*, *Memecylon Cantleyi*, *M. longifolium*, *M. gracilipes*, *M. floribundum*, *M. malaccense*, *Uncaria parviflora*, *Coptosapelta parviflora*, *Argostemma rugosum*, *A. nervosum*, *A. grandiflora*, *A. trichanthum*, *Mussaenda spectabilis*, *Urophyllum coriaceum*, *Randia oocarpa*, *M. incurva*, *M. Roxburghii*, *Gardenia elata*, *Petunga comifera*, *Timonius hirsutus*, *Coffea viridiflora*, *Ixora montana*, *I. crassifolia*, *I. patens*, *I. fluminalis*, *Lasianthus bractescens*, *L. crassifolius*, *L. politus*, *L. villosus*, *L. glaberrimus*, *Morinda elliptica*, *Coelospermum biovulatum* Clarke, *Psychotria rudis*, *P. setistipula*, *P. minutiflora*, *Cephaelis angustifolia*, *C. elliptica*, *C. triceps*, *C. elongata*, *Erigeron oreophilum*, *Vaccinium loranthifolium*, *V. Wrayi*, *Ardisia singaporensis*, *Pelaequium calophylloides*, *Paysonia lanceolata*, *P. utilis*, *Linociera spicifera*, *L. parvifolia*, *Alstonia micrantha*, *Microchloa furcata*, *M. brachypetala*, *M. tenuifolia*, *Dischidia fruticulosa*, *Fagraea caudata*, *F. gigantea*, *Gaertnea sessiliflora*, *G. pedicellata* and *Monochoria elata*. One new genus, *Perilimnastes*, of the Melastomaceae is proposed being based on *Anerincleistus fruticosus* Ridl.

1124. ROCK, JOSEPH F. New species of Hawaiian plants. Bull. Torr. Bot. Club 45: 133-139. Pl. 6. 1918.—The following new species of plants are described: *Cyanea Giffardii*, *C. rollandiodidies*, *Rollandia angustifolia* (*R. longifolia* β var. *angustifolia* Hillbr.), *Lobelia oahuensis*, and *Straussia glomerata*.

1125. ROCK, JOSEPH F. *Pelea* and *Platydesma*. Bot. Gaz. 65: 261-267. Fig. 1. 1918.—The author presents critical notes on the two Rutaceous genera mentioned in the title and describes the following as new to science: *Pelea Gayana* (*P. sapotaefolia* Mann. var. (?) *procumbens* Hdb.), *P. cinerea* (Gray) Hdb. var. *rubra*, and *P. recurvala* (*P. kauaiensis* Hdb., not Mann.)

1126. SAFFORD, W. E. *Chenopodium Nuttalliae*, a food plant of the Aztecs. Jour. Washington Acad. Sci. 8: 521-527. Fig. 3. 1918.—The author describes and illustrates a new species of *Chenopodium* from Mexico under the name given in the title.

1127. SARGENT, C. S. Notes on North American trees. I. *Quercus*. Bot. Gaz. 65: 423-459. 1918.—This article consists of critical notes on North American oaks with descriptions and copious citations of material of several new species and varieties, chiefly from the southern and southwestern United States. Several new hybrid oaks are also defined and to these binomial names have been given.

1128. SARGENT, C. S. Notes on North American trees. III. *Tilia*. I. Bot. Gaz. 66: 421-438. 1918.—The author presents an introductory article on a synoptical treatment of the American lindens. Fifteen species are included in the key and seven of these are described in detail. Five of the seven species described and seven varieties are characterized as new.

1129. SAXTON, W. T., AND L. J. SEDGWICK. Plants of northern Gujarat. Records Bot. Surv. Ind. 6: 207-323. Index, i-xiii, 1 folded map. 1918.—The authors divide their paper into three parts namely, Part I "Descriptive and Analytical," Part II "Oecology," and Part III "Flora." Under the last caption upwards of 600 endemic or well established species of flowering plants are enumerated. No new species nor varieties are included.

1130. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*. II. The *Microcarpi*, exclusive of *Lupinus densiflorus*. Bull. Torr. Bot. Club 45: 1-22. Figs. 1-16. 1918.—The present paper deals with the species of the subgenus *Platycarpus* Watson, a group peculiar to the west coast of America, in which the author recognizes six species namely, *Lupinus malacophyllus* Greene, *L. microcarpus* Sims, *L. horizontalis* Heller, *L. subvexus* C. P. Smith, *L. luteolus* Kell., and *L. densiflorus* Benth. The first five species are treated in detail, and several varieties are characterized. The same author (*ibid.* 167-202, figs. 17-42) discusses *Lupinus densiflorus* Benth. and differentiates twenty-five varieties.

1131. STANDLEY, PAUL C. The North American species of *Genipa*. Jour. Washington Acad. Sci. 8: 639-643. 1918.—The author describes two new species of the Rubiaceae from Panama namely, *Genipa Mazonii* and *G. Williamsii*.

1132. STEPHENSON, T., AND T. A. STEPHENSON. A new form of *Helleborine viridiflora*. Jour. Bot. 56: 1-4. 1918.—A new form, *vectensis*, of this species is recorded from the Isle of Wight.

1133. WERNHAM, H. F. New Rubiaceae from the Belgian Congo. Jour. Bot. 56: 308-314. 1918.—The following new species of Rubiaceae are described: *Mussenda Nannanii*, *Sabicea congensis*, *Stipularia mollis*, *Tricalysia ealensis*, *Vangueria oblanceolata*, *Cuviera latior*, *Ixora Vermoesenii*, *Rutidea Vanderystii*, *Globulostylis cuvieroides*, and *Amaralia Batesii*.

1134. WERNHAM, H. F. Dr. H. O. Forbes's New Guinea Rubiaceae. Jour. Bot. 56: 68-77, 129-135. 1918.—Twenty-eight new species and a new variety are described, based on collections made in New Guinea in 1885-1886.

1135. WERNHAM, H. F. The Genus *Manettia*. Jour. Bot. 56: (Supplement) 1-16. 1918.—In continuation of his studies on tropical American Rubiaceae the author has begun a detailed revision of *Manettia*, a genus occurring chiefly in the American tropics.

1136. WHITE, J. W. Notes supplemental to the flora of Bristol. Jour. Bot. 56: 11-18, 40-49, 77-87. 1918.—Critical notes on a relatively large number of species are recorded, which are of particular interest to the student of the English flora.

1137. WIEGAND, K. M. Some species and varieties of *Elymus* in eastern North America. Rhodora 20: 81-90. 1918.—This paper deals with *Elymus virginicus* and *E. canadensis* L. and their immediate allies. Seven species and several varieties are described and of these one species, *E. riparius*, and one variety, *E. robustus* var. *vestitus*, are characterized as new to science. *E. halophilus* Bicknell is treated as a variety of *E. virginicus* L.; and *E. glaberrimus* Scribner & Ball is treated as a variety of *E. australis* Scribner & Ball.

1138. WIEGAND, K. M. A new variety of *Triosteum aurantiacum*. Rhodora 20: 116. 1918.—*Triosteum aurantiacum* var. *glaucescens* Wiegand is described from central New York and Pennsylvania.

1139. WILMOTT, A. J. Two new plants from Macedonia. Jour. Bot. 56: 145-146. 1918.—*Paliurus microcarpus* and *Calamintha epilosa* are described; both species were discovered near Salonica.

1140. WOLF, W. *Quercus bernardiensis* sp. nov. Torreyana 18: 161-162. 1918.—This new species of oak is described from specimens collected in Cullinan County, Alabama.

BOTANICAL ABSTRACTS

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for all of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although some of them are shown on cover page 1 of the present issue.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

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Vol. I

JANUARY, 1919
ENTRIES 1141-1439

No. 5

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1141. COOK, MEL. T. Modern application of botany. Paper read at Dedication Exercises of Brooklyn Botanic Garden, April 16, 1917. Mem. Brooklyn Bot. Gard. 1: 123-127. July 6, 1918.—Gives brief discussion of the relation of the economic importance of botany. Reviews the relationship of early botanical work to medicine, and the gradual development of the subject. Refers to the relationship that should exist between botany and allied subjects. Discusses the future of botany in America, giving special attention to its application through plant physiology, plant breeding, and plant pathology. Special attention is called to the relationship of plant pathology to research along lines of taxonomy, morphology, and physiology. Attention is also called to the unfortunate conditions which tend to broaden the gap between botany on the one side and horticulture, agronomy, and forestry on the other.—M. T. Cook.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

1142. ADAMSON, R. S. On the relationship of some associations of the southern Pennines. Jour. Ecol. 6: 97-109. 2 fig. June, 1918.—Upon the broader tops of these hills, at elevations of 1000 to 1200 feet, are areas of moorland characterized by deep wet peat occupied by a plant association dominated by *Eriophorum vaginatum*. This association is, however, largely in stages of decay and replacement due to the cutting back of streams and the resultant drainage of the peat. Upon the drained peat *Empetrum nigrum* appears followed by *Vaccinium myrtillus*. When removal of the peat accompanies drainage a grassland association dominated by *Nardus stricta* often appears.

On the slopes and at lower altitudes with thinner peat mingled with soil are associations of *Deschampsia flexuosa*, *Nardus stricta*, *Vaccinium myrtillus*, and *Calluna vulgaris* in a more or less definite successional series ending with the *Calluna* association. The present large extent of the grassland associations, recognized as earlier or degenerate stages in the succession, is ascribed to a large extent to the effects of sheep grazing.—Geo. D. Fuller.

1143. COWLES, HENRY C. Retrogressive and progressive successions in the Arkansas Sunk-Lands. Jour. Ecol. 6: 95-96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—The sunk country of the Mississippi bottomlands

has for the most part two types of progressive successions, both hydrarch as to origin. One, of course, is the familiar flood plain succession, starting with the sand bars and having successive belts of invading vegetation, commencing with willows and followed later by the sycamore, cottonwood, and other flood plain pioneers. Then follows a long-enduring temporary climax (subclimax) composed of bottom land oaks, hickories, hackberry, etc. The second progressive hydrarch succession occurs in cut-offs, incident to changes in the river channel. Here there develop the familiar cypress swamps, following the more primitive aquatic stages. These swamps also develop into the above named flood plain temporary climax. The earthquake of 1811 caused an extensive sinking of the earth's crust over vast areas of the Mississippi bottoms, thus instituting a sudden retrogression in the vegetable development. Probably much of the area now covered by cypress swamps had reached the above noted temporary climax or even the regional climax at the time of the earthquake. Since that time it is probable that the vegetational course has been essentially progressive. This region presents a sharp contrast in the suddenness of vegetative change produced by the earthquake to the more common (and usually overlooked) retrogressive changes brought about by gradual subsidence or elevation.

1144. HARPER, ROLAND M. The plant population of northern lower Michigan and its environment. *Bull. Torrey Bot. Club* 45: 23-42. 3 fig. Jan., 1918.—Rev. by Fuller in *Bot. Gaz.* 66: 390-391. 1918. [See *Bot. Absts.* 1, Entry 9.]

1145. HOFMAN, J. V. The influence of vegetation on reforestation in the Cascade Mountain Region. *Jour. Ecol.* 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—This paper covers briefly the influence of shrubs and annuals on reproduction, whether natural or artificial. The conclusions are based on data gathered in connection with natural reproduction studies, and planting and sowing experiments during the past five years. The effect of different degrees of shading by the native vegetation on various sites such as north slope, south slope, etc., is shown. The general conclusions show that shading in this region is not an important factor except at the extreme limits of either site quality or density of shade.—*J. V. Hofman.*

1146. MACCAUGHEY VAUGHAN. Algae of the Hawaiian Archipelago. I. *Bot. Gaz.* 65: 42-57. Jan., 1918.—A paper mainly ecological in its point of view. [See *Bot. Absts.* 1, Entry 200.]

1147. MUNNS, EDWARD N. Some biological and economic aspects of the chaparral. *Jour. Ecol.* 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—This paper embraces a discussion of evidence pointing to the fact that the so-called true chaparral of Southern California is temporary in its character and that tree growth existed prior to the brush and will again cover that area if given a full chance. The evidence presented in support of this view is that of the fossil deposits found at La Brea; the brush species of the north associated with the coniferous forests are also found in the south; stubs and charcoal remains of tree growth are found in dense brush areas where no one can recall such growth; trees (species of spruce and several pines) are in scattered stands in the chaparral; and plantations of coniferous trees have been successfully established. Fire has been the agency which is responsible for the decrease in tree growth and the increase in the brush areas, and if the fire rotation can be increased from its present rate to one greater than the tree rotation, trees will again come in naturally.—*Edward N. Munns.*

1148. SALISBURY, E. J. The oak hornbeam woods of Hertfordshire. Parts III and IV. *Jour. Ecol.* 6: 14-52. 2 fig., 20 tables. Mar., 1918.—In this region of England occur several thousand acres of oak forest characterized by an undergrowth of the hornbeam, *Carpinus Betulus*. Such forests are regarded as peculiar to light non-calcareous soil and seem to admit of division into two types, the first dominated by *Quercus Robur* formerly described by the same author (*Jour. Ecol.* 4: 83-117. 1916), and the other with *Q. sessiliflora* now discussed for the first time. Quantitative data on climate, humus and water content of the soil are pre-

sented as well as the results of light measurement within the forest during both the "light phase" and "shade phase" of the season, these phases being due respectively to the absence and presence of foliage. To these factors the various associations are related and the composition of the various communities is carefully examined. The humus and water contents of the *Quercus Robur* woods are found to be greater than those of the areas dominated by *Q. sessiliflora* while an analysis of the shrub and herbaceous flora shows that forests of the former type have many calcicolous species as contrasted with the calcifugous character of the *Q. sessiliflora* forest. Among the calcicole species cited are *Barbarea vulgaris*, *Sisymbrium alliaria*, *Arenaria trinervia*, and *Pimpinella major* contrasting with such calcifuges as *Stellaria uliginosa*, *Galium saxatile*, *Calluna vulgaris*, *Digitalis purpurea*, *Pteris aquilina*, *Blechnum Spicant* and *Nephrodium montanum*. The *Q. Robur-Corylus* woods, the *Q. Robur-Carpinus* woods and the *Q. sessiliflora* woods form a series in which the flora becomes more and more calcifuge in character.—*Geo. D. Fuller*.

1149. WEIR, JAMES R. Notes on the altitudinal range of forest fungi. *Mycologia* 10: 4-14. Jan., 1918. [See Bot. Absts. 1, Entries 13, 449.]—Abst. in Jour. Roy. Microsc. Soc. 1918: 222. 1918.

1150. WOODRUFFE-PEACOCK, E. ARDIAN. A fox-covert study. *Jour. Ecol.* 6: 110-125. 1918.—An area of woodland planted 120 years ago in North Lincolnshire, England, is studied particular attention being given to the success or failure of the tree species, the character of the undergrowth and the invasion and establishment of new species. Means of dispersal are carefully considered and species of more than ordinary interest noted. Man's influence in effecting changes is shown to be dominant.—*Geo. D. Fuller*.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

1151. BRUSH, WARREN D. Distinguishing characteristics of the North American sycamore woods. *Bot. Gaz.* 64: 480-96. Dec., 1917.—The characteristics of the wood of the three species of sycamore (*Platanus*) native to the United States are dealt with. These three species are the common sycamore of the east (*P. occidentalis*), California sycamore (*P. racemosa*) and Arizona sycamore (*P. Wrightii*). The wood of all three is very similar in appearance and properties and requires magnification for positive identification. The paper contains a full description of the gross and minute structure of the wood of all three species, although *P. occidentalis* is given the most complete treatment. The three woods may best be distinguished by the differences in their medullary rays that are so prominent in them. *P. occidentalis* has the widest and lowest rays,—14 cells by 50 cells on the average, a ratio 1:5. *P. racemosa* has the narrowest and tallest,—4 by 107 cells, a ratio of 1:26, while *P. Wrightii* is intermediate with rays averaging 8 by 84 cells or a ratio 1:12. Excellent microphotographs showing the three woods in cross and tangential section as well as *P. occidentalis* in radial section together with drawings of special parts fully illustrate the article. [See Bot. Absts. 1, Entry 985.]—*F. S. Baker*.

1152. DANA, SAMUEL T. Finland's public-owned forests. *Canadian Forest. Jour.* 14: 1727-29. June, 1918.—The forests of Finland are estimated to occupy over half the total area of the country and of this the State owns over 31,000,000 acres or half of the total. Only two-fifths of this is productive forest, the rest being swampy and marsh land, with some cultivated areas. Most of the State forests are in north Finland and consist of protection forests interspersed with areas of barren lands. Eight million acres of these lands in the extreme north are classed as protective forests and no financial returns are looked for. Since 1874 some 40,000 acres have been purchased at \$5.13 per acre.

The stand per acre of productive forests varies from 486 cubic feet to 2000 cubic feet, averaging 715 cubic feet per acre in north Finland and 1430 in southern Finland. Eighty-five per cent of the forest products sold from the State forests in 1911 was saw timber to the value of \$2,495,200. In 1912 the cut amounted to 6.43 cubic feet per acre from productive forest land. Sales are made by auction to the highest bidder. Trees are sold as single logs, the average price in 1912 was 83 cents varying between 12 cents and \$1.93. Of this 76.6 per cent was Scotch pine (*Pinus sylvestris*) and 23.4 per cent Norway spruce (*Picea excelsa*).—Fire suppression has reduced the losses from fire to \$12.05 per acre in 1912 when only 991 acres were burned over.—Three sawmills are operated by the State, originally to utilize undesirable timber as fuel for the State railways. Later, a considerable export business developed. By operating mills, the Government has obtained a clear insight into timber conditions in the international market and a better grasp of the lumber industry.—The income from the State forests in 1912 amounted to \$2,726,853 or a net income of 12.7 cents per acre which is high for the poor quality of material and the relative inaccessibility of these forests. About 200 trained foresters are employed regularly, augmented by many temporary appointments. The University of Helsingfors gives a three year course.—*E. N. Munns.*

1153. HARPER, ROLAND M. A phytogeographical sketch of southern Maryland. Jour. Washington Acad. Sci. 8: 581-589. 1918.—For phytogeographic purposes the author divides the part of Maryland between Chesapeake Bay and the fall line into five regions. For each region the commonest native trees of saw-log size are listed in order of importance, the species more abundant than in any of the other regions being indicated as a means of picking out the characteristic species at a glance. The estimated percentage of evergreens in each region is given, as an index of soil fertility. The geology, topography, and salient forest conditions are briefly described and some notes on significant shrubs and herbs are added.—*E. H. Frothingham.* [See Bot. Absts. 2, Entry 903.]

1154. LANGDON, LA DEMA M. The ray system of *Quercus alba*. Bot. Gaz., 65: 313-323. April, 1918.—This article is primarily a discussion of a study made to determine the effect of different conditions on the production of broad (multiseriate) rays and narrow (uniseriate) rays in white oak (*Quercus alba*). Neither age of the trees nor location of the wood in the tree was found to materially affect the ray systems. In suppressed growth due to shade, however, the multiseriate rays appeared only in later years, the delay being roughly proportional to the degree of suppression. It was also found that the position of multiseriate rays in one year seedlings was definitely related to the traces and that these are also responsible for the form of the young cylinder of xylem, which has a wavy outline of five lobes instead of a perfect circle. The article is prefaced by a brief discussion of the theories of the evolution of the medullary rays but the results of the present investigation are not definitely linked up with any of this work, although the influence of the leaf trace in causing the production of multiseriate rays is brought out. [See Bot. Absts. 1, Entry 581.]—*F. S. Baker.*

1155. SAMPSON, ARTHUR W. Climate and plant growth in certain vegetative associations. U. S. Forest Service Bull. 700. October, 1918.—The investigation seeks to correlate the growth of peas, wheat, and brome grass with physical factors in three vegetative associations or forest types in the Wasatch Mountains of Utah. A detailed climatic study by instrumental methods was made in the 3 types, which are arranged altitudinally as follows: Oak-brush, 6500 to 7800 feet; Aspen-fir, 7500 to 9500 feet; Spruce-fir, 9000 to 11,000 feet. The plants were grown in sealed pots at each of the three main climatic stations.

The climatic studies bring out the following relations: Mean annual temperature and length of growing season increase gradually from the highest to the lowest type. Precipitation increases with altitude up to the aspen-fir type, but above the aspen-fir type there is a slight decrease. Evaporation is greatest in the oak brush, slightly less in the spruce-fir, and considerably less in the aspen-fir. Wind movement is the greatest factor controlling evaporation; it is greater by 100 per cent in the spruce-fir than in the lower types. Sunshine duration

and intensity are practically the same in all the types. Only in the lowest type are the effective heat units and length of growing season sufficient to mature crops like wheat and peas. The rate at which plants mature decreases directly with the decrease in effective heat units. The water requirement for the production of a unit weight of dry matter is proportional to intensity of evaporation. Total production is inversely proportional to evaporation. Stem elongation is determined largely by temperature, and seems to be little influenced by evaporation. The photosynthetic efficiency of leaves as indicated by the production of dry matter appears to vary inversely with evaporation, although temperature is recognized as an important factor.—G. A. Pearson.

1156. STERRETT, W. D. Utilization of ash. U. S. Dept. Agric. Bull. 523. 52 p. 10 pl., 3 fig. June 29, 1917.—Although ash supplies only 2.5 or 3 per cent of the total hardwood lumber cut, it ranks among the leading North American hardwoods because of intrinsic qualities. There are 18 native species of ash, but 98 per cent of ash lumber is from three species—white ash (*Fraxinus americana*) most important in New England, the Middle Atlantic, and the Central States; green ash (*F. lanceolata*), in the South Atlantic States, the lower Mississippi Valley, and in Iowa, Kansas, Nebraska, and South Dakota; and black ash (*F. nigra*) in the Lake States. Census returns indicate an annual lumber cut of from 200,000,000 to 300,000,000 board feet, and the equivalent of 25,000,000 or 35,000,000 board feet cut into slack barrel stock. Practically the whole output is used in the manufacture of so-called secondary products (handles, butter tubs, vehicle stock, etc.). The total consumption appears about the same for ash as for hickory or cottonwood. Ash lumber production has passed its maximum and is decreasing. Tables showing the rank of States in amount of lumber cut for a series of years reveal a constant shifting in rank and a waning importance of old growth timber as compared with second growth. In seventeen years, ending 1915, the annual cut in the Lake States fell from (approximately) 38 to 15 per cent of the total, while production in the lower Mississippi rose from 18 to 32 per cent. Of the present supply two-thirds is second growth, chiefly in woodlots, and one-third is virgin timber, chiefly in large tracts. The supply of old growth may be exhausted in ten years, but second growth is likely to take its place and prevent any immediate heavy decrease in cut. The annual growth of ash in the United States is probably less than 160,000,000 board feet. The general characteristics and structure of the wood are described, and a key is given for identification of four commercial species. A chapter on mechanical properties of the wood, contributed by J. A. Newlin, tabulates the results of many tests on wood of different species of ash, and combines these in convenient terms for comparison. The effects of specific gravity, growth-rate, position in tree, age, heart and sap, and species upon the mechanical properties are discussed. Details of the use of ash by different industries are given, together with a discussion of lumber prices, costs of production, and value of standing timber.—E. H. Frothingham.

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

1157. ALLARD, H. A. Some studies in blossom color inheritance in tobacco, with special reference to *N. sylvestris* and *N. tabacum*. Amer. Nat. 53:79-84. Jan.-Feb., 1919.—*Nicotiana tabacum* with white, carmine, and pink-blossomed varieties and *Nicotiana sylvestris* with white blossoms were studied. Pink \times carmine and reciprocals showed perfect dominance of carmine in F_1 and 3:1 segregation in F_2 . Later generations and back crosses showed that results were due to a single factor difference. Both whites were recessive to either pink or carmine, although the F_2 carmine was lighter than parent. Carmine \times white (*N. tabacum*) in F_2 segregated from white to carmine. Whites bred true although some with almost imperceptible sheen of color carried carmine factor giving both pinks and carmines when crossed with pink.—Carl Kurtzweil.

1158. ANONYMOUS. Disease resistance. Gard. Chron. 64: 218. Nov. 30, 1918.—Comment on note in American Journal of Botany, January 1918, of work in isolating strains of asparagus resistant to rust; also that strains of tomatoes resistant to *Fusarium wilt*, flax resistant to *Fusarium lini* have been developed and their economic status established.—C. E. Myers.

1159. ANONYMOUS. Butter fat percentage independent of age of cow. Jour. Heredity 9: 249. Oct., 1918.—Studies in Delaware College herd establish fact that age of a cow does not influence butter fat test of her milk, and, therefore, in study of inheritance behavior of this characteristic age of cow need not be considered.—R. K. Nabours.

1160. ANONYMOUS. Fecundity in Rhode Island red breed of domestic fowl. Jour. Heredity 9: 333-334. Nov., 1918.—Review, with excerpts, of paper by Goodale on fecundity in Rhode Island reds. [See Bot. Absts. 1, Entry 881.] Compares results with those of Pearl on Barred Plymouth Rocks. Goodale finds that fecundity is influenced by other characters, such as broodiness and maturity, so that fecundity is not a good character to test effectiveness of selection; but with Pearl he agrees that fecundity is inherited.—A. F. Shull.

1161. ATKINSON, G. F. Quadruple hybrids in the F_1 generation from *Oenothera nutans* and *Oe. pycnocarpa*, with the F_2 generations, and back crosses and intercrosses. Genetics 2: 213-260. 16 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 331. Mar., 1918.

1162. ATKINSON, G. F. Twin hybrids from *Oenothera Lamarckiana* and *Oe. franciscana* when crossed with *Oe. pycnocarpa*. Science 46: 222. 1917.—Abst. in Exp. Sta. Rec. 37: 820. Feb. 28, 1918.

1163. BACKHOUSE, G. O. [The improvement of wheat in Argentina.] Mon. Agric. Nac. Buenos Aires. Dir. Gen. Enseñanza e Invest. Agric. Pub. 73. 72 p. 17 fig.—Abst. Exp. Sta. Rec. 38: 741. June, 1918.

1164. BARKER, E. E. Heredity studies in the morning glory (*Ipomoea purpurea*). New York Cornell Agric. Exp. Sta. Bull. 392. 38 p., 3 pl. 1917.—Abst. in Exp. Sta. Rec. 38: 750. June, 1918.

1165. BAUR, ERWIN. Mutationen von *Antirrhinum majus*. [Mutations of *Antirrhinum majus*.] Zeitschr. indukt. Abstamm. Vererb. 19: 177-193. 10 fig. June, 1918.

1166. BEIJERINCK, M. W. The enzyme theory of heredity. Proc. Kon. Akad. Wetensch. Amsterdam 19: 1275. 1917.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. 19: 202-203. June, 1918.

1167. BEIJERINCK, M. W. De enzymtheorie der erfelijkheid. [The enzyme theory of heredity.] Kon. Akad. Wetensch. Amsterdam 25: 1231. 1917.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. 19: 202-203. June, 1918.

1168. BIFFEN, R. H. The suppression of characters on crossing. Jour. Genetics 5: 225-228. July, 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 218. June, 1918.

1169. BISSET, PETER. Prolification in a double-flowered form of *Calendula officinalis*. Jour. Heredity 9: 323-325, fig. 12, 13. Nov., 1918.—Prolification in *Calendula* is uncommon. These plants were grown in Washington, D. C. in 1918. Writer's attention first attracted by strange behavior of several flower heads. Central head was apparently normal, but later produced several buds, some from center of flower head. These developed into secondary flower heads and opened fully, and in several instances again produced buds that developed flower heads (tertiary) each time smaller than the preceding. No seed developed and the plant being annual the variation was lost.—Author notes prolification in double-flowered

English daisy and also frequently among common roses which often takes form of prolonged flower stalk arising from center of parent flower, often producing leaves and a bud which later develops into a flower. The proliferation in *Calendula* is attributed to environmental conditions.—C. E. Myers.

1170. BLAKESLEE, A. F., AND B. T. AVERY. Adzuki beans and jimson weeds. Favorable class material for illustrating the ratio of Mendel's law. Jour. Heredity 8: 125-131. Fig. 4. 1917.—Abst. in Exp. Sta. Rec. 37: 831. Feb. 28, 1918.

1171. BLAKESLEE, A. F., J. A. HARRIS, D. E. WARNER, AND W. F. KIRKPATRICK. Pigmentation and other criteria for the selection of laying hens. Connecticut Storrs Exp. Sta. Bull. 92: 93-194. 23 fig. 1917. Also abst. in Exp. Sta. Rec. 39: 74-75. July, 1918.

1172. BLAKESLEE, A. F., AND D. E. WARNER. Correlation between egg-laying activity and yellow pigment in domestic fowl. Amer. Nat. 49: 360-368. 1915.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 216-217. June, 1918.

1173. BLARINGHEM, L. Les complexes végétaux et leurs disjonctions par la vieillesse. Ann. inst. Pasteur 32: 60-70. 1918.—As plant chimera, *Cytisus Adami*, grows old, branches appear with all characteristics of one or other of the two constituents, *C. Laburnum* or *C. purpureus*. Hybrids of cereals also exhibit vegetative dissociation into characters of parents,—e.g., in some barley hybrids base of ear is of type of one parent and apex of ear of other, while intermediate region, where sterility is prominent, presents mosaic of the two characters. Anatomical analysis of tissues of plant hybrids confirms Naudin's hypothesis that hybrid is a mosaic in which discordant elements are not visible unless elements of same species come together, when there will result parts discernible to the eye as belonging to one of parent species. Suitable external conditions can accelerate this vegetative dissociation, and examples of this are cited. Parasitism of rusts and smuts is regarded as similar case of a plant complex, where the two constituents grow together for a time without injury to either. These complexes also dissociate themselves into their constituents, host plant and fungus, as result of certain abnormal conditions of growth, and when one or other member of complex approaches maturation. Influence of nutrition on relation of the two constituents of this complex is discussed. [Through abst. by W. S[tiles] in Physiol. Absts. 3: 292. July-Aug., 1918.]

1174. BLEULER, E. Mendelismus bei Psychosen, speziell bei der Schizophrenie. [Mendelism in psychoses, especially in schizophrenia.] Schweiz. Arch. Neurol. u. Psychiat. 1: 1917.—Italian abst. by E. Lugaro, in Riv. Patologia nerv. ment. 15: 60-61. Mar. 23, 1918.

1175. BORING, ALICE M., AND T. H. MORGAN. Luteal cells and hen-feathering. Jour. General Physiol. 1: 127-131. Sept., 1918.—In male of ordinary fowl, luteal cells characteristic of ovary of hen, are absent. In hen-feathered Sebright male, luteal cells are present in testes. Castration of Sebright male causes him to develop full plumage of ordinary cock. Removal of ovary of hen causes her also to develop full plumage of cock. It is plausible therefore that luteal cells produce internal secretion that suppresses, in hen-feathered Sebright male and in ordinary female, development of full plumage of ordinary cock. [Abst. by W. M. B[ayliss] in Physiol. Absts. 3: 458. Nov.-Dec., 1918.]—C. B. Bridges.

1176. BORING, ALICE M., AND RAYMOND PEARL. Sex studies. XI. Hermaphrodite birds. Jour. Exp. Zool. 25: 1-47. 9 pl., 9 fig. 1918.—Abst. in Jour. Roy. Microsc. Soc. 1918: 292. Sept., 1918.

1177. BROWN, THOS. W. Orange like fruit from a lemon tree. Jour. Heredity 9: 303-310. Fig., 4-6. Nov., 1918.—Brief communication accompanied by photographs.—M. C. Coulter.

1178. BURGER, O. F. Variations in *Colletotrichum gloeosporoides*. Phytopath. 7: 151. 1917.—Abst. in Exp. Sta. Rec. 38: 252. April 22, 1918.

1179. COCKERELL, T. D. A. New forms of red sunflowers. Gard. Chron. 64: 186. Nov. 9, 1918.—Two new series of *Helianthus annuus* described: (1) Vinous series, including *flavobasis*, *trizonatus*, *semivinosus*, *reversus*, *pallescens*, *passiflora*, and *apicalis*. (2) Chestnut series, including *apicalis*, *basalis*, *dilutus* and *latibasis*. Two forms of rays are described, *convolutus* and *revolutus*. Author desires information regarding new varieties of sunflower and Jerusalem artichoke.—E. L. Proebsting.

1180. COLE, L. J. Determinate and indeterminate laying cycles in birds. Anat. Rec. 11: 504-505. 1917.—Abst. in Exp. Sta. Rec. 37: 869. Feb. 28, 1918.

1181. COLLINS, G. N. Hybrids of *Zea tunicata* and *Z. ramosa*. Proc. Nation. Acad. Sci. U. S. Amer. 3: 345-349. 1917.—Abst. in Exp. Sta. Rec. 38: 525. June 14, 1918.

1182. COLLINS, G. N. New place effect in maize. Jour. Agric. Res. 12: 231-243. Feb., 1918.—Abst. in Exp. Sta. Rec. 38: 738-739. June, 1918. [See Bot. Absts. 1, Entry 17.]

1183. COLLINS, G. N., AND J. H. KEMPTON. Breeding sweet corn resistant to the corn earworm. Jour. Agric. Res. 11: 549-572. 1917.—Abst. in Exp. Sta. Rec. 38: 445. April, 1918.

1184. CORRENS, C. Zur Kenntnis einfacher mendelnder Bastarde. I. Die Unterscheidung der pilulifera-Homozygoten und der Heterozygoten des Bastardes *Urtica pilulifera* Dodartii. II. *Mirabilis jalapa xantha* und ihre Bastarde. III. *Urtica urens perseaurea*. [Contributions to knowledge of simple Mendelian hybrids. I. The distinguishing of pilulifera homozygotes and the heterozygotes of the hybrid *Urtica pilulifera* Dodartii. II. *Mirabilis jalapa xantha* and its hybrids.] Sitzungsber. K. Preuss. Akad. Wiss. 1918: 221-268. 1918.—Attempt is made [in second paper] to estimate pigments in different varieties of *Mirabilis jalapa*. Conclusion is drawn that the chlorophyll varieties do not appear to originate from normal green type by disappearance of characters, but that characters become latent or suppressing factors come into operation. [Through Abst. by I. J[ørgensen] in Physiol. Absts. 3: 299. July-Aug., 1918.]

1185. COULTER, MERLE C. Self-sterility. Bot. Gaz. 66: 461-462. Nov., 1918.—Discussion of: East, E. M., and J. B. Park. "Studies on self-sterility. I. The behavior of self-sterile plants." Genetics 2: 525-609. 1917. While praising work of these authors as "exemplary piece of research," questions adequacy of theory that occurrence of intra-sterile inter-fertile classes rests upon heterozygosis.

1186. COULTER, MERLE C. Mutationists and selectionists. Bot. Gaz. 66: 463-464. Nov., 1918.—Brief statement of controversy between those who, like Castle, hold that selection can modify unit characters, and those who maintain that modifications result from mutations which occur independently of direction of selection. Refers particularly to papers of H. S. Jennings, "Modifying factors and multiple allelomorphs in relation to the results of selection." (Amer. Nat. 51: 301-306. 1917.) and "Observed changes in hereditary characters in relation to evolution." (Jour. Washington Acad. Sci. 7: 281-301. 1917.) Holds that, at present, advantage seems to be with mutationists because of definiteness of basis provided for description of genetic phenomena.

1187. COULTER, MERLE C. Continuous variation. Bot. Gaz. 66: 540-541. Dec., 1918.—Brief note on: Stout, A. B. and Helene M. Boas. Statistical studies of flower number per head in *Chichorium intybus*: kinds of variability, heredity, and effects of selection. Mem. Torrey Bot. Club 17: 334-453. Pl. 10-13. 1918.

1188. COULTER, MERLE. New place effect. Bot. Gaz. 66: 541. Dec., 1918.—Brief discussion of: Collins, G. N. "New place effect in maize." Jour. Agric. Res. 12: 231-243. 1918. [See Bot. Absts. 1, Entry 17.]

1189. COULTER, MERLE C. Dominance and parasitism. Bot. Gaz. 66: 541. Dec. 1918.—Note on: Jones, D. F. "Segregation of susceptibility to parasitism in maize." Amer. Jour. Bot. 5: 295-300. 1918. Points out that Jones's conclusion that the most heterozygous maize, because most vigorous, will be most resistant to disease, can not be accepted as universal rule because some diseases are known to thrive best in the most vigorous hosts. Suggests that difference may depend upon fact that some diseases are immediately destructive to host, others not.

1190. COULTER, MERLE C. Inheritance of height in peas. Bot. Gaz. 66: 543. Dec., 1918.—Refers to recent work indicating that height in peas is affected by more than one factorial difference, particularly citing: O. E. White. "Inheritance studies in Pisum. III. The inheritance of height in peas." (Mem. Torrey Bot. Club 17: 316.) [See Bot. Absts. 1, Entry 250.], who concludes that there are at least 5 such factor differences, two affecting internode length and 3 internode number.

1191. COULTER, MERLE C. Inheritance in Pisum. Bot. Gaz. 66: 543. Dec., 1918.—Note on: O. E. White. "Inheritance studies in Pisum. IV. Interrelation of the genetic factors of Pisum." (Jour. Agric. Res. 11: 167-190. 1917.) [See Bot. Absts. 1, Entry 250.], especially commending section on "Modification of the expression of Pisum factors by different environments and by each other." States that this is one of first successful attempts to make intensive study of inheritance. Refers to similar work on corn being done under direction of R. A. Emerson at Cornell.

1192. COULTER, MERLE C. Practical breeding. Bot. Gaz. 66: 544. Dec., 1918.—Commends work of Collins, G. N., and J. H. Kempton, "Breeding sweet corn resistant to the corn earworm." (Jour. Agric. Res. 12: 549-572. 1917.), who have selected four superficial characters which were found to be correlated with amount of damage done by earworms.

1193. COULTER, MERLE C. The morning glory in genetics. Bot. Gaz. 66: 544. Dec., 1918.—Note on: Barker, E. E. Hereditary studies in the morning glory (*Ipomoea purpurea*). Cornell Univ. Agric. Exp. Sta. Bull. 392. 38 p., 3 pl. 1917.

1194. COWGILL, H. B. Vegetable improvement. Porto Rico Dept. Agric. Sta. Rept. 1917: 27, 28. 1917.—Abst. in Exp. Sta. Rec. 39: 39. July, 1918.

1195. COWGILL, H. B. Report of the plant breeder. Porto Rico Dept. Agric. Sta. Rept. 1917: 15-26, 29-36. 6 fig. 1917.—Abst. in Exp. Sta. Rec. 39: 33. July, 1918.

1196. DAHLGREN, K. V. O. Eine acaulis-Varietät von *Primula officinalis* und ihre Erblichkeitsverhältnisse. [An acaulis variety of *Primula officinalis* and its inheritance.] Svensk Bot. Tidskrift 10: 536-541. 1916.—Rev. by H. Rasmuson in Zeitschr. induct. Abstamm. Vererb. 19: 220. June, 1918.

1197. DOWNEY, JUNE E. Standardized tests and mental inheritance. Jour. Heredity 9: 311-314. Fig. 7. Nov., 1918.

1198. EAST, E. M. The behavior of self-sterile plants. Science 46: 221-222. 1917.—Abst. in Exp. Sta. Rec. 37: 820. Feb. 28, 1918.

1199. EAST, E. M., AND J. B. PARK. Studies on self-sterility. I. The behavior of self-sterile plants. Genetics 2: 505-609. 1917.—Abst. in Exp. Sta. Rec. 38: 823. Aug. 9, 1918. [See also following Entry, 1200.]

1200. EAST, E. M., AND J. B. PARK. Studies on self-sterility. II. Pollen-tube growth. Genetics 3: 353-366. 3 fig. July, 1918. [See also preceding Entry, 1199.]

1201. EDGERTON, C. W. A study of wilt resistance in the seed-bed. Phytopath. 8: 5-14. fig. 1-4. 1918. [See Bot. Absts. 1, Entry 94.]

1202. EUREN, H. F. The heredity of dual-purpose cattle. 96 p. A. D. Euren: Norwich, England.—Abst. in Exp. Sta. Rec. 37: 866. Feb. 28, 1918.

1203. FEYTAUD, J. Sur la reproduction parthénogénétique de l'Otiorynque sillonne (*Otiorynchus sulcatus* Fahr.) [Onparthenogenetic reproduction of *Otiorynchus sulcatus*.] Compt. Rend. Paris 165: 767-769. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 48. Mar., 1918.

1204. FRUWIRTH, C. Die Umzüchtung von Wintergetreide in Sommergetreide. [The breeding of winter cereals into summer cereals.] Zeitschr. Pflanzenzüchtung 6: 1-46. Mar., 1918.—See Bot. Absts. 2, Entry 935.

1205. GATES, R. R. Vegetative segregation in a hybrid race. Jour. Genetics 6: 237-253. 1 pl. 1917.—Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1206. GATES, R. R. Heredity and mutation as cell phenomena. Amer. Jour. Bot. 2: 519-528. 1915.—Rev. by M. J. Sirks in Zeitschr. indukt. Abstamm. Vererb. 19: 203-204. June, 1918.

1207. GLASER, OTTO. Hereditary deficiencies in the sense of smell. Science 48: 647-648. Dec. 27, 1918.—M, a Russian Jew from Kiev, lacks sense of smell. Alcohol, illuminating gas, ether, chloroform, flowers, or pepper, produce choking, sneezing, or various "feelings" only. Among M's relatives, characterized by stammering, early and complete loss of incisors, frequent hernia, a thumb nearly twice normal width, excessive sex interest, and considerable mental powers, are two normal sisters and following olfactory defectives: two brothers (one with slight sense of smell), mother, maternal grandfather, and a cousin, the daughter of a paternal aunt whose husband, from different family is "smell-blind." Trait is hereditary and possibly sex-linked. Large number of duplex females is explained by presence of many olfactory defectives in M's former place of residence.—P. W. Whiting.

1208. GOODALE, H. D. Further data on the relation between the gonads and the soma of some domestic birds. Anat. Rec. 11: 512-514. 1917.—Abst. in Exp. Sta. Rec. 37: 868-869. Feb. 28, 1918.

1209. GOODALE, H. D. Crossing over in the sex chromosome of the male fowl. Science 46: 213. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1210. GOODALE, H. D. The feminization of male birds. Jour. Amer. Assoc. Instr. and Invest. Poultry Husb. 3: 68-70. 1917.—Abst. in Exp. Sta. Rec. 38: 275. April 22, 1918.

1211. GOODALE, HUBERT D. Feminized male birds. Genetics 3: 276-299. 2 pl. May, 1918.—Brown Leghorn cockerels were castrated and ovarian tissue engrafted. They developed comb and wattles of feminine character; weight was like that of typical male, much larger than female; spurs were present in male; mating instincts were like those of the male.—Plumage characteristics were of two types,—either (type 1) like typical females in shape, color, barbule arrangement, but with size slightly larger, corresponding with their body size; or (type 2) variable and tending toward black as in male. Type 2 appears incompletely feminized but is considered really due to genetic differences in stock, as blackish hens also appeared.—Feminized cockerel previously described as well as four of 1916 series and two of 1915 series were type 1, while one of 1915 series and two of 1916 series were type 2. 1915 series differed from others in showing no sexual activity.—Implantation of ovarian tissue in ten male birds containing testicular material had no effect on characteristics and the ovarian tissue usually degenerated.—Three feminized Gray Call drakes showed head modified from bright green of male to dull color of female. Feathers of body were of mixed character but upward curl of male tail feathers did not appear. Neck ring of male was absent.—Author suggests that each character may be considered separately after manner of a Mendelian unit. Thus spurs appear in normal males, capons, feminized males, ovariectomized females, and in

females of certain strains of poultry. Control exerted by ovarian secretion is in this respect therefore slight.—Comb and wattle character is determined by type of gonad present. In capons and many ovariectomized hens they are juvenile; in feminized cocks they are feminine.—Body size in ovariectomized hen is small like that of normal hen. Capon is larger than male. Feminized cockerel is size of normal male. Ovary has no influence on body size since castrated females have body size of intact females, while feminized cockerels have body size of male.—Feminized males are masculine in mating instinct while capons are simply reflex. Capons possess brooding instinct, but this is sometimes present in normal cocks. Castrated hens are neutral or masculine in behavior.—Capons have very long feathers thus showing intensified male characteristic, but this may be correlated with greater body size. Feminized males have plumage shape like that of females, showing that ovary controls this character. In color castrated females are like males, while feminized males are like females; capons are like males; ovary therefore controls color.—Gonadal secretions are probably not simple, since their effects are diverse. Secondary sexual characters may depend upon "recessive" sex-linked factors. ["Recessive" here evidently means semipotent, for recessive sex-linked factors find expression in both sexes.]—*P. W. Whiting.*

1212. GOODMAN, C. W. Selecting and testing seed corn. Texas Dept. Agric. Bull. 53 23 p., 10 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 739. June, 1918.

1213. GOWEN, JOHN W. Studies in inheritance of certain characters of crosses between dairy and beef breeds of cattle. Jour. Agric. Res. 15: 1-58, 6 pl. Oct., 1918.—Preliminary paper, Mendelian study based on 48 F₁ and 8 F₂ individuals from crosses involving Ayreshire, Guernsey, Jersey, Holstein-Friesian, and Aberdeen-Angus breeds. Individual records of each animal are given. Results suggest dominance of black body color to other colors, of pigmented muzzle to unpigmented, pigmented tongue to unpigmented, black switch to other switch colors. White in inguinal region appears to be dominant, but white on face, neck, shoulders, rump, flanks, and legs appears to be recessive to self-color. Polled is generally dominant to horned, but apparently testicular hormones influence results, for male heterozygotes are much more likely to show spurs or even horns than female heterozygotes, somewhat similar to cases in sheep. Beef conformation appears in F₁ in head and fore quarters, but rather marked dairy type is seen in body and hind quarters. High milk production appears dominant, but high butter-fat percentage appears recessive.—*J. A. Detlefsen.*

1214. GRANTHAM, A. E. The relation of cob to other ear characters in corn. Jour. Amer. Soc. Agron. 9: 201-217. 1 pl. 1917.—Abst. in Exp. Sta. Rec. 38: 532. June 14, 1918.

1215. GRIER, N. M. Sexual dimorphism and variation in *Ginkgo biloba*. Torreyia 17: 225. 1917.—[See Bot. Absts. 1, Entry 1327.] Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1216. HAECKER, VALENTIN. Entwicklungsgeschichtliche Eigenschaftsanalyse (Phäno-genetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. [Developmental analysis of characters (phenogenetics). General problems of development, heredity and eugenics.] 8 vo., 344 p., 181 fig. G. Fischer: Jena, 1918.—Contents freely translated from publisher's announcement in Zool. Jahrb. 41: cover p. 2. 1918: (1) Problems of character analysis or racial analysis. (2) Developmental analysis of characters in unicellular organisms. (3) Size differences. (4) Asymmetry. (5) Hair, feathers and similar ectodermal structures. (6) General consideration of pigmentation. The ferment-chromogen hypothesis. (7) Color races of the Axolotl and mammals. (8) Color races of birds. (9) Color races of plants. (10) Albinism and albinoidism. (11) Partial albinism, variegation and distinctive markings ["Abzeichen"]. (12) Tiger-striping, dappling, tiger-flecking, luster. (13) White variegation in birds, lower vertebrates and plants. (14) Wild color pattern. (15) Views held hitherto concerning the causes of color pattern. (16) Color pattern and the growth of the skin. (17) Color pattern and skin growth in Axolotl. (18) Application of skin-growth hypothesis to special cases. (19) Color pattern of birds. (20) Abnormalities of the extremities and tail. (21) Combs, horns, antlers. (22) Form of cranium and type of

face. (23) A developmental law of heredity. (24) Developmental analysis of science, the science of the hereditary constitution, and ethnology. (25) Developmental rule of inheritance, and pluripotency.

1217. HALLQUIST, CARL. Ein neuer Fall von Dimerie bei *Brassica Napus*. [A new case of dimery in *Brassica napus*.] Bot. Notiser 1916: 39-42. 1916.—Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. 19: 222. June, 1918.

1218. HALLQUIST, CARL. Brassicakreuzungen. [Brassica crosses.] Bot. Notiser 1915: 97-112. 1915.—Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. 19: 221-222. June, 1918.

1219. HANCE, R. T. An attempt to modify the germ plasm of *Oenothera* through the germinating seed. Amer. Nat. 51: 567-572. 1917.—Abst. in Exp. Sta. Rec. 39: 30. July, 1918.

1220. HANCE, ROBERT T. Variations in the number of somatic chromosomes in *Oenothera scintillans* de Vries. Genetics 3: 225-275. 7 pl., 5 fig. May, 1918.—See Bot. Absts. 2, Entry 410.

1221. HARLAND, S. C. On the inheritance of the number of teeth in the bracts of *Gossypium*. West Indian Bull. 16: 111-120. 4 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 532-533. June 14, 1918.

1222. HARRIS, J. A. Biometric studies on the somatic and genetic physiology of the sugar beet. Amer. Nat. 51: 507-512. 1917.—Abst. in Exp. Sta. Rec. 38: 729. June, 1918.

1223. HARRIS, J. ARTHUR. Further illustrations of the applicability of a coefficient measuring the correlation between a variable and the deviation of a dependent variable from its probable value. Genetics 3: 328-352. July, 1918.

1224. HARRIS, J. A. Further studies on the relationship between bilateral asymmetry and fertility and fecundity in the unilocular fruit. Genetics 2: 186-204. 3 fig. 1917. [See Bot. Absts. 1, Entry 885.]—Abst. in Exp. Sta. Rec. 38: 29. Jan., 1918.

1225. HARRIS, J. A. On the applicability of Pearson's biserial r to the problem of asymmetry and fertility in the unilocular fruit. Genetics 2: 205-212. 1 fig. 1917. [See Bot. Absts. 1, Entry 887.]—Abst. in Exp. Sta. Rec. 38: 29. Jan., 1918.

1226. HARRIS, J. A. Supplementary determinations of the relationship between the number of ovules per pod and fertility in *Phaseolus*. Genetics 2: 282-290. 2 fig. 1917. [See Bot. Absts. 1, Entry 886.]—Abst. in Exp. Sta. Rec. 38: 29. Jan., 1918.

1227. HARRIS, J. A., A. F. BLAKESLEE, AND D. E. WARNER. The correlation between body pigmentation and egg production in the domestic fowl. Genetics 2: 36-77. 16 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 276. April 22, 1918.

1228. HAWKES, ONERA A. MERRITT. Studies in inheritance in the hybrid *Philosamia* (*Attacus*) *ricini* (Boisdo.) ♂ × *Philosamia* *cynthia* (Drury) ♀. Jour. Genetics 7: 135-154. 1 pl., 2 fig. 1918. [See Bot. Absts. 1, Entry 31.]—Abst. in Jour. Roy. Microsc. Soc. 1913: 191, June, 1918.

1229. HAYS, FRANK A. The influence of excessive sexual activity of male rabbits. II. On the nature of their offspring. Jour. Exp. Zool. 25: 571-613. April, 1918. [See Bot. Absts. 1, Entry 224.]—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 297-298. Sept., 1918.

1230. HILL, ARTHUR W. The history of *Primula malacoides*, Franchet, under cultivation. Jour. Genetics 7: 193-198. 1 fig., 2 pl. May, 1918.

1231. HILSON, G. R., AND F. R. PARNELL. A simple method of selfing cotton. Madras Agric. Dept. Yearbook 1917: 54, 55. 1917.—Abst. in Exp. Sta. Rec. 39: 234. Nov. 15, 1918.

1232. HINES, C. W. Seedling cane. Philippine Agric. Rev. 10: 32-42, 5 pl., 1 fig. 1917.—Abst. in Exp. Sta. Rec. 39: 237. Nov. 15, 1918.

1233. HONING, J. A. Selection experiments with Deli tobacco. Meded. Deli-Proefstat. Medan, 10: 79-128. 1917.—Abst. in Exp. Sta. Rec. 38: 741. June, 1918.

1234. HONING, J. A. Variabilität der bastardsplittings. (Variabilität der Bastardspaltung). [Variability of hybrid splitting.] Verslagen gew. verg. Kon. Akad. Wet. Amsterdam, Wis- en Natuurk. Afdeling 25: 794-805. Nov., 1916.—Rev. by M. J. Sirks in Zeitschr. indukt. Abstamm. Vererb. 19: 204-205. June, 1918.

1235. HUTCHESON, T. B., AND T. K. WOLFE. The effect of hybridization on maturity and yield in corn. Virginia Agric. Exp. Sta. Tech. Bull. 18: 161-170. 1917.—Abst. in Exp. Sta. Rec. 39: 31. July, 1918.

1236. IBSEN, H. L., AND E. STEIGLEDER. Evidence for the death in utero of the homozygous yellow mouse. Amer. Nat. 51: 740-752. 1 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 573. June 14, 1918.

1237. IKENO, S. Studies on the hybrids of *Capsicum annum*. II. On some variegated races. Jour. Genetics 6: 201-229. 1 pl., 2 fig. 1917.—Abst. in Exp. Sta. Rec. 39: 123. Aug. 1918.

1238. IKENO, S. A note on some variegated races of *Capsicum annum*. Jour. Genetics 6: 315-316. 1917. [See Bot. Absts. 1, Entry 900.]—Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1239. IKENO, S. Variegation in *Plantago*. Genetics 2: 390-416. 2 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 731. June, 1918.

1240. JACKSON, S. "Rogues" among potatoes. Gard. Chron. 64: 210. Nov. 23, 1918.

1241. JACKSON, S., AND A. W. SUTTON. "Rogues" among potatoes. Gard. Chron. 64: 162-163. Oct. 19, 1918.—Two letters dealing with supposed "sport" from Sharpe's Victor potato grown by first author, authenticity of which is doubted by second author. [See Bot. Absts. 1, Entry 944.] Latter urges necessity of making sure that no contamination of culture has taken place, before accepting aberrant form as bud-sport of variety with which it has grown.—Richard Wellington.

1242. JEFFREY, EDWARD C. Evolution by hybridization. Mem. Brooklyn Bot. Gard. 1: 298-305. 1 pl. July, 1918.—Brief résumé and discussion of importance of hybridization factor in plant evolution. Pollen sterility, under normal growth conditions, indicative not of mutability, but of hybridization. Evidence from systematic, phytogeographic and morphological studies shows crossing of species in nature an extremely common cause of species multiplication. Physiological and genetical criteria must not be given greater weight than the more reliable historical (paleobotanical) and morphological criteria in speculations regarding origin of species. Evidence from *Oenotheras* not suited to furnish decisive proof for de Vries's mutation theory. Multiplication of species by hybridization does not invalidate Darwin's hypothesis, but merely supplies an additional species-forming agent. Hybridization not universal cause for origin of new species, as maintained by Lotsy. Original species must have arisen in some other manner. Adaptation of floral structures to cross-fertilization important from standpoint of frequency of natural hybrids.—O. E. White.

1243. JENNINGS, H. S. The numerical results of diverse systems of breeding. Genetics 1: 53-89. 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 205. June, 1918.

1244. JOHANSEN, W. Tilsyneladende arvelig Selektionsvirkning. (Scheinbare erbliche Selektionswirkung. [Apparently hereditary effect of selection.] Overs. over d. kgl. danske Videnskabernes Selskabs Forhandlinger 1915. 1915.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 217-218. June, 1918.
1245. JONES, D. F. Dominance of linked factors as a means of accounting for heterosis. *Genetics* 2: 466-479. 1 fig. 1917.—Abst. in *Exp. Sta. Rec.* 38: 367. Mar., 1918.
1246. JONES, J. M. Sheep breeding and feeding. *Texas Sta. Bull.* 205. 24 p., 5 fig. 1917.—Abst. in *Exp. Sta. Rec.* 37: 866. Feb. 28, 1918.
1247. JONES, L. R. Disease resistance in cabbage. *Proc. National Acad. Sci. U. S. Amer.* 4: 42-46. 1918.—Abst. by F. K[idd] in *Physiol. Absts.* 3: 305. July-Aug., 1918. [See *Bot. Absts.* 1, Entry 321.]
1248. KAPTEYN, J. C. Skew frequency curves in biology and statistics. *Recueil Trav. bot. Néerl.* 13: 105-157. 1916.—Rev. by Tine Tammes in *Zeitschr. indukt. Abstamm. Vererb.* 19: 205-206. June, 1918.
1249. KENT, O. B. How to select laying hens. *New York State Coll. Agric. Cornell Univ. Ext. Bull.* 21. P. 23-33, 5 pl., 9 fig. 1917.—Abst. in *Exp. Sta. Rec.* 38: 775. June, 1918.
1250. KEZER, ALVIN, AND BREEZE BOYACK. Mendelian inheritance in wheat and barley crosses with probable error studies on class frequencies. *Colorado Agric. Exp. Sta. Bull.* 249. 139 p., 9 pl., 10 fig. Oct., 1918.—See *Bot. Absts.* 2, Entry 682.
1251. KIRKHAM, W. B. Embryology of the yellow mouse. *Anat. Rec.* 11: 480-481. 1917.—Abst. in *Exp. Sta. Rec.* 38: 573. June 14, 1918.
1252. KRANICHFELD, H. Die Einwände Heribert Nilsson's gegen die Mutationslehre von H. de Vries. [Heribert-Nilsson's criticisms of the mutation theory of H. de Vries.] *Biol. Zentralbl.* 37: 61-98. 1917.—German Abst. in *Zeitschr. Pflanzenzüchtung* 6: 52. Mar., 1918.
1253. KRAUSSE, A. Polydaktylie auf Sardinien. [Polydactyly in Sardinia.] *Die Naturwiss.* 4: 723. 1916.—Rev. by Hermann W. Siemens in *Zeitschr. indukt. Abstamm. Vererb.* 19: 207-208. June, 1918.
1254. LAMON, H. M. Value of breeding from selected stock. *Jour. Massachusetts Poultry Soc.* 1: 15-16, 24, 30-32. 1917.—Abst. in *Exp. Sta. Rec.* 38: 775. June, 1918.
1255. LANCEFIELD, D. E. An autosomal bristle modifier, affecting a sex-linked character. *Amer. Nat.* 52: 462-464. Aug.-Sept., 1918.—A recessive modifying gene in third chromosome of *Drosophila melanogaster* affects dominance of sex-linked bristle character (forked) which is ordinarily completely recessive. Females heterozygous for forked, homozygous for this third-chromosome modifier, will exhibit forked bristle character to limited extent. The third chromosome gene produces no visible effect in flies not heterozygous for forked.—C. B. Bridges.
1256. LANCEFIELD, D. E. A case of abnormal inheritance in *Drosophila melanogaster*. *Amer. Nat.* 52: 556-558. Oct.-Nov., 1918.—Author reports aberrant inheritance of sex-linked genes of *Drosophila*. Progeny tests gave three aberrant cultures but further tests gave entirely normal results. Data obtained were insufficient for analysis.—C. B. Bridges.
1257. LEHMANN, ERNST. Variabilität und Blütenmorphologie. [Variability and floral morphology.] *Biol. Zentralbl.* 38: 1-38. Jan., 1918.

1258. LENZ, DR. FRITZ. Eine Erklärung des Schwankens der Knabenziffer. [An explanation of the decrease in number of boys.] Archiv. Rassen- u. Gesellschaftsbiol. 11: 629. 1914-15.—Rev. by Hermann W. Siemans in Zeitschr. indukt. Abstamm. Vererb. 19: 208-209. June, 1918.

1259. LEWIS, H. R. Selection: The basis of improving the poultry flock. New Jersey State Hints to Poultrymen 5: 1-4. 1917.—Abst. in Exp. Sta. Rec. 37: 871. Feb. 28, 1918.

1260. LILLIE, FRANK R. The free-martin, a study of the action of sex hormones in the foetal life of cattle. Jour. Exp. Zool. 23: 371-452. 29 fig. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 37. Mar., 1918.

1261. LOEB, J. Further experiments on the sex of parthenogenetic frogs. Proc. Nation. Acad. Sci. U. S. Amer. 4: 60-62. 1918.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 290. Sept., 1918. Physiol. Absts. 3: 328. Sept. 1918. [See Bot. Absts. 1, Entry 912.]

1262. LOTSY, J. P. Oenothera Lamarckiana considered as a nuclear chimera. Arch. Néerland. Sci. Exact et Nat. III, 3: 324-350. 6 pl. 1917.—Abst. in Exp. Sta. Rec. 39: 226. 1918.

1263. LOVE, H. H., AND A. C. FRASER. The inheritance of the weak awn in certain *Avena* crosses. Amer. Nat. 51: 481-493. 2 fig. 1917.—Abst. in Exp. Sta. Rec. 39: 234-235. 1918.

1264. LOVE, H. H., AND G. P. MCROSTIE. The inheritance of hull-lessness in oat hybrids. Amer. Nat. 53: 5-32. 7 fig. Jan.-Feb., 1919.—See Bot. Absts. 2, Entry 420.

1265. McEWEN, R. S. The reactions to light and to gravity in *Drosophila* and its mutants. Jour. Exp. Zool. 25: 49-106. 3 fig. 1918.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 303-304. Sept., 1918.

1266. MACINNIS, L. T. The testing of pure-bred cows in New South Wales. Jour. Heredity 9: 307, 335. Nov., 1918.

1267. MACLEOD, J. Quantitative description of ten British species of genus *Mnium*. Jour. Linn. Soc. 44: 1-58. 9 fig. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 69. Mar., 1918.

1268. MALINOWSKI, E. Über die durch Kreuzung hervorgerufene Vielförmigkeit beim Weizen. [On the variability of wheat induced by crossing.] Ext. C. R. Soc. Sci. Varsovie 9: 733-756. 1916.—Rev. by E. Schiemann in Zeitschr. indukt. Abstamm. Vererb. 19: 219. June, 1918.

1269. MALINOWSKI, E. On the inheritance of some characters in the radishes. Ext. C. R. Soc. Sci. Varsovie 9: 757-776. 1 pl. 1916.—Rev. by E. Schiemann in Zeitschr. indukt. Abstamm. Vererb. 19: 223. June, 1918.

1270. METZ, CHARLES W. Chromosome studies on the Diptera. 2. The paired association of chromosomes in the Diptera, and its significance. Jour. Exp. Zool. 21: 213-280. 8 pl. 1916. [See next following Entry, 1271.]

1271. METZ, CHARLES W. Chromosome studies on the Diptera. 3. Additional types of chromosome groups in the Drosophilidae. Amer. Nat. 50: 587-599. 1 pl. 1916. This and next preceding Entry, 1270, rev. by Harry Federley in Zeitschr. indukt. Abstamm. Vererb. 19: 211-213. June, 1918.

1272. MORGAN, T. H. The theory of the gene. Amer. Nat. 51: 513-544. 12 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918.

1273. MORGAN, T. H. Inheritance of number of feathers of the fantail pigeon. Amer. Nat. 52: 5-27. 14 fig. 1918.—Abst. in Jour. Roy. Microsc. Soc. 1918: 181. June, 1918. [See Bot. Absts. 1, Entry 39.]

1274. MURPHY, MISS L. Fourth Irish egg-laying competition, 1915-16. Supplementary report on the noncompeting pens, with some notes on the breeding of Rhode Island Reds for egg production. Jour. Dept. Agric. and Tech. Instr. Ireland 17: 280-289. 1917.—Abst. in Exp. Sta. Rec. 38: 172-173. Feb., 1918.

1275. NESS, H. Hybrids of the live oak and overcup oak. Jour. Heredity 9: 263-268. Fig. 6-8. Oct., 1918.—Author crossed live oak (*Quercus virginiana*) with overcup oak (*Q. lyrata*). These species ripen their acorns at same time and are of same genus but differ widely in systematic characters. Cross was easily effected and resulting hybrids made growth of about 16 feet in eight years. Two lots of hybrids were secured, all of which are very uniform and vigorous. *Q. lyrata* type of tree is dominant. Leaves are very uniform but intermediate in size and somewhat in shape, with *lyrata* type slightly more pronounced. Live oak dominates in fruit except in size, which is intermediate. Bark resembles that of *lyrata*. Hybrid is superior to parents as an ornamental because of superior form, density, and luster of foliage. One F_2 plant has been obtained. Its stem is shorter-jointed than that of F_1 ; leaves similar to those of F_1 . Author has been unable to cross *Q. nigra* with *Q. virginiana*. Natural hybrid, *Q. lyrata-virginiana*, is quite common in Mississippi, Louisiana, Alabama and Texas. Artificially produced hybrid closely resembles wild hybrids.—C. E. Myers.

1276. NEWMAN, H. H. The biology of twins. ix + 186 p., 1 pl. 55 fig. Chicago Univ. Press: Chicago, 1917.—Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.

1277. NIEWLAND, J. A. Teratological notes. Amer. Midl. Nat. 5: 231. 1918.

1278. ONSLOW, H. A contribution to our knowledge of the chemistry of coat colour in animals and of dominant and recessive whiteness. Proc. Roy. Soc. London 89: 36-58. 1915.—Rev. by Tine Tamme in Zeitschr. indukt. Abstamm. Vererb. 19: 211. June, 1918.

1279. OSBORN, H. F. Biocharacters as separable units of organic structure. Amer. Nat. 51: 449-456. 1917.—Abst. in Exp. Sta. Rec. 38: 823. Aug. 9, 1918.

1280. PEARSON, K., AND A. W. YOUNG. On the product-moments of various orders of the normal correlation surface of two variables. Biometrika 12: 86-92. Nov., 1918. See Bot. Absts. 2, Entry 697.

1281. PELLEW, CAROLINE. Types of segregation. Jour. Genetics 6: 317-339. 1 pl. 1917.—Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1282. PELLEW, CAROLINE, AND FLORENCE M. DURHAM. The genetic behaviour of the hybrid *Primula Kewensis*, and its allies. Jour. Genetics 5: 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 219. June, 1918.

1283. PHILIPTSCHENKO, I. Observations on the skulls of hybrids between wild and domestic horses and cattle. Compt. Rend. Soc. Biol. [Paris] 78: 636-638. 1915.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918.

1284. PLATE, L. Vererbungsstudien an Mäusen. [Inheritance studies on mice.] Arch. Entw.-Mech. Organ. 44: 291-336. 5 fig. 1918. ve

1285. PLOUGH, HAROLD H. The effect of temperature on crossing over in *Drosophila*. Jour. Exp. Zool. 24: 147-209. 9 fig. 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 303. Sept., 1918.

1286. PUNNETT, REGINALD CRUNDALL. *Mimicry in butterflies*. 188 p., 16 pl. Cambridge Univ. Press: Cambridge, England. 1915.—Rev. by Harry Federley in *Zeitschr. indukt. Abstamm. Vererb.* 19: 213-215. June, 1918.

1287. RICHARDS, MILDRED HOGE. Two new eye colors in the third chromosome of *Drosophila melanogaster*. *Biol. Bull.* 35: 199-206. Oct. 1918.—During a temperature experiment with *Drosophila melanogaster*, a recessive mutant eye color, scarlet, appeared. Its gene lies in third chromosome (3.8 as calculated from the data) to left of dichaete. Appearance of mutant character is almost identical with older mutant, vermilion, of first chromosome. An independent origin of "scarlet" has been recently reported by Lancefield [See Bot. Absts. 1, Entry 1527.] Another recessive mutant eye color, rose, appeared in same experiment.—C. B. Bridges.

1288. ROBERTSON, W. R. B. A mule and a horse as twins, and the inheritance of twinning. *Kansas Univ. Sci. Bull.* 10: 293-298. 4 pl. 1917.—Abst. in *Exp. Sta. Rec.* 38: 574. June 14, 1918.

1289. ROSEN, D. Zur Theorie des Mendélismus. 1. Über scheinbare Koppelungs- und Abstossungs-phänomene bei gewissen polymeren Spaltungen. 2. Über den analytischen Wert von Ruckkreuzungen. [On the theory of Mendelism. 1. On apparent coupling—and repulsion—phenomena in certain polymeric segregations. 2. On the analytical value of back crossing. *Bot. Notiser* 1916: 289-298. 1916—Rev. by Rasmuson in *Zeitschr. indukt. Abstamm. Vererb.* 19: 207. June, 1918.

1290. SCHMIDT, J. Investigations on hops. X. On the aroma in plants raised by crossing. *Compt. Rend. Trav. Lab. Carlsberg* 11: 330-332. 1917.—Abst. in *Exp. Sta. Rec.* 39: 234. 1918.

1291. SEMON, RICHARD. Die Fusssohle des Menschen. [The footsole of man.] *Arch. mikrosk. Anat.* 82: 164-211. 1913.—Rev. by Hermann W. Siemens in *Zeitschr. indukt. Abstamm. Vererb.* 19: 209-210. June, 1918.

1292. SHAMEL, A. D. A dry blood-orange strain. *Jour. Heredity* 9: 174-177. 2 fig. Apr., 1918.—Abst. in *Exp. Sta. Rec.* 39: 142. Aug., 1918. [See Bot. Absts. 1, Entry 45.]

1293. SHAMEL, A. D. Striking orange bud variations. *Jour. Heredity* 9: 189-191. 2 fig. 1918.—Abst. in *Exp. Sta. Rec.* 39: 142. Aug., 1918. [See Bot. Absts. 1, Entry 46.]

1294. SHAMEL, A. D. Why navel oranges are seedless. *Jour. Heredity* 9: 246-249. Oct., 1918.—Fruits of Washington navel oranges are seedless because anthers do not develop pollen. When pollinated by other varieties, as Valencia, navel bears viable seeds. A very few specimens bearing seeds have been found in crops from performance-record trees, but this is attributed to accidental transfer of pollen by bees. Appearance of navels in the Ruby Blood variety is commonly attributed to cross-pollination with navel, but in reality these navels are true bud variations which occur in varying degrees on Ruby Blood variety.—A seedy strain of navel was discovered in 1910. In this anthers develop viable pollen which falls on stigma before petals open. Subsequently fecundation takes place.—C. E. Myers.

1295. SHAMEL, A. D. Lemon orchard from buds of single selected tree. *Jour. Heredity* 9: 319-320. Fig. 11. Nov., 1918.

1296. SHAMEL, A. D., AND C. S. POMEROY. A fruiting orange thorn. *Jour. Heredity* 9: 315-318. Fig. 8-10. Nov., 1918.

1297. SHORE-BAILEY, W. Hybrid Wigeon. *Avic. Mag.* 10: 15-16. 1 pl. Nov., 1918.—Hybrids between Chili ♂ (*Mareca sibilatrix*) × English Wigeon ♀ (*N. penelope*) are said to resemble very closely the American Wigeon or Baldpate (*M. americana*), and author suggests possibility of the American species having arisen as a cross. Five hybrids reared were all drakes. Photograph of two in accompanying plate.—L. J. Cole.

1298. SHULL, A. F. Sex determination in *Anthothrips verbasci*. *Genetics* 2: 480-488. 1917.—Abst. in *Exp. Sta. Rec.* 38: 558. June 14, 1918.

1299. SHULL, A. FRANKLIN. Genetic relations of the winged and wingless forms to each other and to the sexes in the aphid *Macrosiphum solanifolii*. *Amer. Nat.* 52: 507-520. Oct.-Nov., 1918.—Four kinds of individuals observed in species discussed: (1) wingless, viviparous females; (2) winged viviparous females; (3) oviparous, sexual females, which are wingless; (4) males.—Breeding tests with first two types (both parthenogenetic) showed that wingless type produced predominantly winged daughters, and *vice versa*. Also, at onset of production of sexual aphids, it was found that wingless, parthenogenetic females produced predominantly males, while winged ones produced predominantly females.—It was further found (1) that in rearing successive generations of parthenogenetic offspring, the proportion of winged forms steadily increased, though wingless forms were chosen in most cases as breeders; (2) there was a gradual increase in tendency of wingless mothers to produce females instead of males, and perhaps also a decrease in number of males produced by winged mothers.—Author endeavors to view these facts from a common standpoint, especially in relation to Riddle's theory of sex, but believes it doubtful if they can be reconciled with latter.—F. B. Summer.

1300. SMITH, KIRSTINE. On the standard deviations of adjusted and interpolated values of an observed polynomial function and its constants and the guidance they give towards a proper choice of the distribution of observations. *Biometrika* 12: 1-85. 9 diagrams. Nov., 1918.

1301. STAKMAN, E. C., F. J. PIEMEISEL, AND M. N. LEVINE. Plasticity of biologic forms of *Puccinia graminis*. *Jour. Agric. Res.* 15: 221-250. Pl. 17-18. Oct. 28, 1918.—Attempts were made to change different biologic forms of *B. graminis* gradually from one parasitic form into another and to increase their virulence on resistant hosts by means of transferring successively to proper, taxonomically related and unrelated, hosts, so-called bridging species. The facts given do not support conclusions of previous workers that pathogenicity of biologic forms is easily changed by host influence. *Puccinia graminis secalis* which does not attack wheat but does infect barley, cultured continuously for three years on barley and other theoretical bridging hosts (*Elymus*, *Agropyrum*, *Bromus*, etc.) acquired no new parasitic capability on account of its association with barley. Same applies to *P. graminis tritici* in its relations to rye as well as to other forms of *Puccinia* tried by the authors (*avenae*, *agrostis*, *phleipratensis*, etc.). Barberry does not increase host range of these forms nor does it act as reinvigorator of the rust; biologic specialization in aecial stage is apparently same as that in uredineal stage. Different forms of *Puccinia*, which must be isolated from mixtures by using differential hosts before starting any experiments seem to be roughly analogous to pure lines. Plus and minus fluctuations may occur but there is always tendency to return to normal. Biologic forms may have arisen either by mutations or by gradual process of evolution. These processes may be operative yet, but writers have not been able to detect any mutation nor to induce perceptible evolutionary changes experimentally. Possible rôle of hybridization will be investigated.—C. A. Gallastegui.

1302. TAMMES, TINE. Die gegenseitige Wirkung genotypischer Faktoren. [The antagonistic action of genotypic factors.] *Rec. Trav. bot. Néerland.* 13: 1916.—Rev. by Th. Stomps in *Zeitschr. induct., Abstamm. Vererb.* 19: 224. June, 1918.

1303. TANAKA, YOSHIMARO. Genetic studies on the silk worm. *Jour. College Agric., Sapporo* 7: 129-255. Pl. 1-4. 1916.—Rev. by Harry Federley, *Zeitschr. induct. Abstamm. Vererb.* 19: 210. June, 1918.

1304. TAYLOR, GEO. M. Bud variation in potatoes. *Gard. Chron.* 64: 229. Dec. 7, 1918.

1305. TRELEASE, W. Naming American hybrid oaks. *Science* 46: 244. 1917.—Abst. in *Exp. Sta. Rec.* 37: 820-821. Feb. 28, 1918.

1306. VALLEAU, W. D. Inheritance of sex in the grape. *Amer. Nat.* 50: 554-564. 1916.—*Abst. in Exp. Sta. Rec.* 39: 242. 1918.

1307. VALLEAU, W. D. Sterility in the strawberry. *Jour. Agric. Res.* 12: 613-670. 6 pl., 4 fig. Mar., 1918. [See *Bot. Absts.* 1, Entry 51.]—*Abst. in Exp. Sta. Rec.* 39: 48-49. July, 1918.

1308. VENKATARAMAN, T. S. A study of the arrowing (flowering) in the sugar cane with special reference to selfing and crossing operations. *Agric. Jour. India, Indian Sci. Cong.* 1917: 97-108. 6 pl. 1917.—*Abst. in Exp. Sta. Rec.* 39: 237. 1918.

1309. VON CARON-ELDINGEN. Die Verbesserung der Getreidearten, veranschaulicht an einer Monographie des Weizens. Neue wissenschaftliche und praktische Erfahrungen für Pflanzenzüchter und Landwirte. [The improvement of the small grains; as exemplified by a monograph of wheat. New scientific and practical experiences for plant breeders and agriculturists.] 8vo. Paul Parey: Berlin, 1918.

1310. WALLER, A. E. Xenia and other influences following fertilization. *Ohio Jour. Sci.* 17: 273-284. 1917.—*Abst. in Exp. Sta. Rec.* 38: 526. June 14, 1918.

1311. WALLER, A., and L. E. THATCHER. Improved technique in preventing access of stray pollen. *Jour. Amer. Soc. Agron.* 9: 191-195. 1 pl. 1917.—*Abst. in Exp. Sta. Rec.* 38: 430. April, 1918.

1312. WERBER, E. I. Experimental studies on the origin of monsters. II. Regarding the morphogenesis of duplicities. *Jour. Exp. Zool.* 24: 409-443. 27 fig. 1917.—*Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc.* 1918: 291-292. Sept., 1918.

1313. WHITE, O. E. Inheritance of endosperm color in maize. *Amer. Jour. Bot.* 4: 396-406. 1917. *Abst. in Exp. Sta. Rec.* 38: 226. April 22, 1918. Also *ibid.* 38: 737-738. June, 1918.

1314. WHITE, O. E. Studies of inheritance in *Pisum*. II. The present state of knowledge of heredity and variation in peas. *Proc. Amer. Phil. Soc.* 56: 487-588. 1917.—*Abst. in Exp. Sta. Rec.* 38: 822-823. Aug. 9, 1918.

1315. WHITE, O. E. Inheritance studies in *Pisum*. IV. Interrelation of the genetic factors of *Pisum*. *Jour. Agric. Res.* 11: 167-190. 1917.—*Abst. in Exp. Sta. Rec.* 38: 226. April 22, 1918.

1316. WILSON, J. A manual of Mendelism. 8 + 152 p., 8 fig. A. and C. Black: London, 1916.—*Abst. in Exp. Sta. Rec.* 38: 367. Mar., 1918.

1317. WINKJER, JOEL G. Coöperative bull associations. U. S. Dept. Agric. Farmers' Bull. 993. 35 p. 7 fig. Washington, 1918.—Table shows growth of movement from 3 associations in 1908 to 36 in 1917. Plans for constitution and by-laws are given. Typical association composed of 15 to 30 farmers, territory being divided into "breeding blocks," one bull assigned to each. As many as 50 to 60 cows may belong to farmers of block. Bull kept on farm most conveniently located and moved every two years to next block to prevent inbreeding.—Association in Maryland furnished figures showing marked improvement due to method outlined. Further data not yet available. Two methods given for selection of sire: (1) on basis of daughters' records; (2) bull whose ancestors have good production records. First method preferred but not so widely used because of added cost of purchasing such a bull.—H. K. Hayes.

1318. WRIGHT, S. Color inheritance in mammals. II-V. *Jour. Heredity* 8: 373-378, 426-430, 473-475, 476-480. 1917.—*Abst. in Exp. Sta. Rec.* 38: 776. June, 1918.

1319. WRIGHT, SEWALL. On the nature of size factors. *Genetics* 3: 367-374. July, 1918.—Mathematical investigation of data obtained by MacDowell and by Castle upon bone measurements of rabbits giving a method of analyzing the effect of factors upon general size and upon individual characters by means of correlation coefficients with one, two and three characters constant. Data treated in this way show slight indications of brachicephaly being associated with long tibia but short femur. Apparently femur most closely related to general growth, width of skull least. Mode of estimating the relative importance of different kinds of growth factors presented and applied to data which shows most differences between individuals involve size of body as a whole but also certain amount of variation of each bone length independently of all others measured and also groups of bones which vary together independently of rest of body such as skull length and breadth and as three leg bones. Femur and tibia of hind leg form a group subject to common influences which do not affect humerus, a bone of foreleg. Femur and humerus, homologous bones in hind and foreleg, vary together independently of tibia.—D. F. Jones.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*.

[Unsigned abstracts are by the editor.]

THALLOPHYTES

1320. HOWE, M. A. Further notes on the structural dimorphism of sexual and tetrasporic plants in the genus *Galaxaura*. *Brooklyn Bot. Gard. Mem.* 1: 191-197. *Pl.* 3-4. 1918.—Certain subgeneric groups of Kjellman and others in *Galaxaura* have relations to each other similar to those which author has shown to exist between forms of *Galaxaura obtusata*. Evidence is presented that the group *Brachycladia* includes tetrasporic plants, of which the sexual phases are found in group *Vepreculae* and that group *Rhodura* is made up wholly of tetrasporic plants, differing much in general habit and structure from their sexual alternates, currently placed in sections *Micothoe* and *Eugalaxaura*.—M. A. Howe.

1321. TURCHINI, JEAN. Rôle de l'heterocyste des Nostocées. [Role of the heterocyst of the Nostocaceae.] *Rev. Gén. Bot.* 30: 273-282. *Pl.* 19. 1918.—Cytological and microchemical studies based upon 3 species of *Nostoc* and 1 of *Anabaena*. Author thinks that idea put forward by some of the older writers, that heterocyst is food-storage organ with possibilities of germination, may be definitely discarded; the heterocyst, once constituted, being in fact a dead cell with vacuolar protoplasm. He finds that in *Nostoc* heterocyst is connected with adjoining vegetative cells by an isthmus longer and more slender than that connecting any two vegetative cells. Owing to fragility of this isthmus, fragmentation of the filaments into hormogones takes place at heterocyst, so that heterocyst presides at division of filament and contributes, in a way, to dissemination of species.—M. A. Howe.

1322. FITZPATRICK, HARRY M. The cytology of *Eocronartium musciicola*. *Amer. Jour. Bot.* 5: 397-419. *Pl.* 30-32. 1918.—*Eocronartium musciicola*, parasitic on mosses, has unusually large nuclei. Cells of mycelium, throughout host, are binucleate, as is also young basidium, but its two nuclei soon fuse and the resulting nucleus passes into resting condition. Synapsis follows and later stages of this division and also of second division show 4 chromosomes, which is the reduced number; since each of the two nuclei of mycelium show a nuclei, making 8 the diploid number. Transverse walls divide basidium into 4 cells, from each of which comes a comparatively large sterigma. Nucleus becomes much attenuated in passing through sterigma into young spore. The centrosome does not seem to be involved in this movement. The origin of binucleate mycelium from uninucleate basidiospore has not yet been determined.—Charles J. Chamberlain.

1323. SKUPIŃSKI, F. X. Sur la sexualité chez les Champignons Myxomycètes. [Sexuality in the Myxomycetes. *Compt. Rend. Paris* 167: 31-33. 1918.—Author presents a brief note upon life history of the myxomycete, *Didymium nigripes*, when grown in single-spore

cultures. Individual spores germinate to zoospores which multiply by division and give rise to myxamoebae which also multiply by division. Ultimately the latter become "gametes" and fuse in pairs to form zygotes which make up plasmodium. Author has succeeded 3 times in starting cultures on sterile media from single isolated myxamoebae and likewise has started cultures twice from single zoospores. In these 5 cases he failed to obtain plasmodia while his original stock culture and the culture secured from an isolated fusion myxamoeba or zygote produced normal plasmodia and fructifications. From observations presented, author concludes that a sexual process exists in *Didymium* in the fusion of (+) and (-) myxamoebae giving rise to zygotes, the aggregation of which forms a plasmodium. Fusion of plasmodia is not considered a sexual process. The species studied is classed as homothallic since a single spore produces both (+) and (-) gametes.—A. F. Blakeslee.

SPERMATOPHYTES

1324. ARBER, AGNES. The Phyllode Theory of the monocotyledonous leaf, with special reference to anatomical evidence. Ann. Bot. 32: 465-501. 32 fig. 1918.—Author discusses de Candolle's "Phyllode" theory of the monocotyledonous leaf, (that such a leaf corresponds essentially to petiole of a dicotyledonous leaf), and Henslow's corollary thereto. She shows that in addition to support for this theory derived from external morphology, there is evidence in its favor from anatomy, particularly the occurrence among certain monocotyledons of inverted vascular bundles in the leaf ("phyllodic" structure). The phyllodic anatomy evident in some of the dicotyledons is discussed and anatomical evidence in support of Henslow's corollary brought forward. Phyllodic anatomy is shown to occur among the presumably ancestral monocotyledons—Helobiae, Liliiflorae and Farinosae—and to be absent among the higher forms. It is believed to be an ancestral character, revealing petiolar origin of leaf of monocotyledons. [See Bot. Absts. 1, Entry 1336.]

1325. ARBER, AGNES. Further notes on intrafascicular cambium in monocotyledons. Ann. Bot. 32: 87-89. 4 fig. 1918.—Abst. by J. M. Coulter in Bot. Gaz. 66: 288. 1918. [See Bot. Absts. 1, Entry 61.]

1326. FULLER, GEO. D. Ecological anatomy of leaves. Bot. Gaz. 65: 487-488. 1918. [Review of: HANSON HERBERT C. Leaf structure as related to environment. Amer. Jour. Bot. 4: 533-560. 21 fig. 1917.]—Effect of differences in various environmental factors (light, evaporating power of air, temperature, humidity and wind velocity) upon structure of leaves and upon their transpiration was studied for a number of species of trees. A wide range of variation in environment and in leaf character was noted in different parts of the leafy crown. Reviewer regards this investigation as particularly important in opening up a promising field in the study of structural response of aerial organs to measured variations in external factors. [See Bot. Absts. 1, Entry 1328.]

1327. GRIER, N. M. Sexual dimorphism and variation in *Ginkgo biloba*. Torreyia 17: 225. 1917.—There seems to be a correlation between the sex of this tree and its growth habit and the shape of its leaves. [Through Abst. in Exp. Sta. Rec. 39: 124. 1918.] [See Bot. Absts. 1, Entry 1215.]

1328. HANSON, H. C. Leaf structure as related to environment. Amer. Jour. Bot. 4: 533-560. 21 fig. 1917.—Abst. in Exp. Sta. Rec. 39: 29. 1918. [See Bot. Absts. 1, Entry 1326.]

1329. HEILBORN, OTTO. Zur Embryologie und Zytologie einiger *Carex*-Arten. Embryology and Cytology of some species of *Carex*. Svensk. Botanisk Tidskrift 12: 212-220. 14 fig. 1918.—Oogenesis and spermatogenesis were studied in several species of *Carex*. Gametophyte number of chromosomes is as follows: *C. pilulifera*, 8; *C. erictorum*, 16; *C. digitata*, 24; *C. caryophyllea* and *C. flava*, 32. Juel had found 52 in *C. Acuta*, and Stout 37 in *C. aquatilis*. *C. pilulifera* has the largest chromosomes, and in species with more numerous chromosomes, the chromosomes are correspondingly smaller. Attempts to cross various species have not yet proved successful, but work is still in progress.—C. J. Chamberlain.

1330. HOLDEN, H. S., AND DOROTHY BEXON. Observations on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of *Cheiranthus Cheiri*. *Ann. Bot.* 32: 513-530. 17 fig. 1918.—A series of seedlings of this species exhibiting cotyledonary abnormalities ranging from hemitricotily to tetracotily were studied, with particular reference to the methods by which cotyledonary increase takes place. Evidence from vascular anatomy indicates that such increase may arise from (1) cotyledonary fission, (2) dichotomy of the growing point of cotyledon, and, more doubtfully, (3) by the downward displacement of one or more epicotyledonary leaves. Previous work on schizocotily, particularly that of Hill and de Fraine and Compton, is shown to be capable of interpretation on this basis and to present illustrations of these three types of increase.

1331. KLIENEBERGER, EMMY. Ueber die Grösse und Beschaffenheit der Zellkerne mit besonderer Berücksichtigung der Systematik. The size and character of nuclei, with special regard to taxonomy. *Beih. Bot. Centralbl.* 35: 219-278. 1918.—Measurements are given of size of nucleus in various tissues of about 100 species of monocotyledons. Nuclear size is more or less constant for a given tissue or organ of a given species. Nuclei of most monocotyledons are not large. Scitamineae, Juncaceae, Cyperaceae, Gramineae and Bromeliaceae all have small nuclei, as do part of the Liliaceae, Amaryllidaceae and Convallariaceae. The remainder of last named families and the Iridaceae are the only ones which appear to have large nuclei.—C. H. Farr.

1332. MARKLE, M. S. Root systems of certain desert plants. *Bot. Gaz.* 64: 177-205. 33 fig. 1917.—A study of root systems in region near Albuquerque, New Mexico [Abst. in *Exp. Sta. Rec.* 39: 29. 1918.]

1333. RECORD, S. J. Significance of resinous tracheids. *Bot. Gaz.* 66: 61-67. 5 fig. 1918.—Abst. in *Exp. Sta. Rec.* 39: 451. 1918. [See *Bot. Absts.* 1, Entry 275.]

1334. RECORD, S. J. Intercellular canals in dicotyledonous woods. *Jour. Forestry* 16: 429-441. 8 fig. 1918.—Abst. in *Exp. Sta. Rec.* 39: 145. 1918. Also rev. by J. M. Coulter in *Bot. Gaz.* 66: 543. 1918. [See *Bot. Absts.* 1, Entries 260, 989.]

1335. SEWARD, A. C. Plant anatomy in relation to evolution. *Nature* 100: 502-503. Feb. 28, 1918. [Review of: E. C. JEFFREY. *The anatomy of woody plants.* x + 478 p. Univ. of Chicago Press. 1917.]—After summing up contents of the various chapters, author criticizes severely the method of treatment and the scope of book. He calls it "an original and stimulating contribution to botanical literature" but "not a comprehensive text-book," finds "the treatment essentially eclectic and the subject matter to a large extent limited by the scope of the author's researches." That there are no references to published work of other authors and no bibliography he believes a very serious blemish in a book presumably intended for students. He concludes, "The fact that Professor Jeffrey is an original investigator whose position entitles him to speak with authority increases one's regret that his attitude is not more in keeping with the best traditions of scientific exposition." [See *Bot. Absts.* 1, Entry 936.]—F. Grace Smith.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

1336. ARBER, AGNES. The phyllode theory of the monocotyledonous leaf, with special reference to anatomical evidence. *Ann. Bot.* 32: 465-501. 32 fig. Oct. 1918.—The results of an extended examination of anatomical details in a large number of types are considered as supporting the phyllode nature of the leaves in the Monocotyledons. The presence of inverted bundles on the adaxial side is taken to indicate such a phyllodic nature. Phyllodic anatomy as thus interpreted is found to be most widely known in the Helobiales and Lil-

liales. In monocotyledons with differentiated petiole and blade the latter is suggested as having been evolved as an expanded apical portion of a phyllode and is therefore a pseudolamina and not strictly comparable with the lamina of a dicotyledonous leaf. The discussion is full and the author gives lists of genera showing phyllodic anatomy. She believes that the Monocotyledonae are monophyletic and derived from dicotyledonous-like ancestors, and considers the geophilous theory of Sargent as more in harmony with the facts than the hydrophilous theory, so-called. Granting that the premises are well taken it is an interesting commentary on the monophyletic hypothesis that no members of the orders Pandanales, Poales, Palmales, Triuridales, Synanthales, Scitaminales, or Arales except *Acorus*, have been shown to exhibit traces of phyllodic anatomy.

1337. BENSON, MARGARET I. *Mazocarpon* or the structure of *Sigillariostrobus*. *Ann. Bot.* 32: 569-589. 4 fig., pls. 17, 18. Oct., 1918.—*Mazocarpon* is a form genus for structural remains of sporangia or sporophylls of a *Lepidophyte* type of remarkable interest since the sporangium is filled with continuous tissue the bulk of which is sterile and may in part represent the sporangiophore of the Arthropitya. The new material studied shows that these sporophylls were borne on pedunculate cones several inches in length and half an inch in diameter, with close set spiral caducous sporophylls of the *Lepidostrobus* type. The megaspores were reduced in number and germinated in situ. The author concludes that the seed habit is approached in two ways (1) in that the megaspore germinated within the sporangium (2) in that the sporangium underwent a certain amount of vegetative development. Fertilization is regarded as having been impossible until fragmentation of the sporangium had taken place owing to the centroscopically directed archegonia. Each prothallus is believed to have normally retained a portion of this nucellar tissue by means of its toothed wall and thus several theoretically seed-like bodies were produced from one sporangium. The structures described in detail may be open to more than a single interpretation, but the author has demonstrated beyond reasonable cavil, that *Mazocarpon* probably represents structural material of cones of the Sigillariaceae—a fact of far reaching importance and interest. Botanists are well acquainted with the cones of the Lepidodendraceae (*Lepidostrobus*) but those of the allied family Sigillariaceae have only been known as the impressions described by Zeiller, Kidston and others under the name of *Sigillariostrobus*. The identity of *Mazocarpon* and *Sigillariostrobus* rests on the intimate association of *Mazocarpon* with leaves bark and denuded cone axes of *Sigillaria*, on detailed comparisons between the structural and impression material and the exact agreement in all of the features that could be compared. Three species of *Mazocarpon* are characterized showing a time range from the Lower Carboniferous through the Upper Carboniferous. A relationship is claimed between *Sigillaria* and the lower Triassic genus *Pleuromioia*, one that most botanists will subscribe to, and much is made of the morphological similarities between *Mazocarpon* and the modern species of *Isoetes*, a suggested relationship that has received rather wide acceptance in the past.

1338. HOLLICK, A. Some botanical problems that paleobotany has helped to solve. *Mem. Brooklyn Bot. Gard.* 1: 187-190. July, 1918.

1339. JEFFREY, E. C. Evolution by hybridization. *Mem. Brooklyn Bot. Gard.* 1: 298-305. Pl. 5. July, 1918.—See Bot. Absts. 1, Entry 1242.

1340. ROWLEE, W. W. Relation of marl ponds and peat bogs. *Mem. Brooklyn Bot. Gard.* 1: 410-414. Fig. 1-3. July, 1918.

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

1341. ARNAUD, G. [Sooty moulds of southern France.] *Bull. Soc. Path. Vég. France* 4: 95. 1917. [Through abstr. in *Internat. Rev. Sci. Pract. Agric.* 9: 898. 1918.]

1342. BALL, E. D., AND R. E. VAUGHAN. Pull the dangerous barberry bushes. Wisconsin Agric. Exp. Sta. Ext. Circ. 102. 4 p. 1918.—Popular discussion of the wheat stem-rust situation in Wisconsin and the relation of the common barberry to the spread of stem-rust. The common barberry is described and compared with the Japanese barberry.—James G. Dickson.

1343. BRIZI, U. [Observations on the damage done to trees by tarring the streets of Milan, Italy.] Rend. R. Inst. Sci. e Lett. Lombardo II, 50: 568-591. 1917.—“The injury is caused almost exclusively by the very fine dust raised by the passage of motor cars along the tarred roads.” The harmful action of the dust is due largely to the action of the vapors given off by the tar when strongly heated by the sun. The most sensitive plants are *Aesculus hippocastanum* and *Ae. carnea*. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 626-627. 1918.]

1344. CAMPBELL, C. [The direct influence on the stock of the sap produced by the scion, and the action on the plant of acid solutions absorbed directly: experiments in Italy.] Rend. R. Accad. Lincei V, 28: 57-61. 1918.—Comes' theory regarding correlation of resistance with acidity was tested.—A wild scion on a cultivated stock rendered shoots from peach and apple stocks resistant to *Exoascus deformans* and *Oidium farinosum* respectively.—Extraradicate introduction of weak solution of tartaric, citric and malic acids rendered cultivated apple immune to *Oidium farinosum* (*B. leucotricha*) and to certain insects. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 674-675. 1918.]

1345. CAPUS, J. La défense contre les parasites de la vigne par les methodes culturales. [Protection against grape vine parasites by cultural methods.] Rev. Vit. 48: 390-393. 1918.—Summer tying of shoots to prevent injury, to allow good circulation of air and to suppress foliage growth thus reducing amount of the mildews, and making treatments easier.—Coulure is reduced by this method but ringing is most effective.

1346. CAPUS, J. Expériences sur l'action du polysulfure contre l'Oidium. [Experiments on the action of polysulphid against Oidium of the vine.] Rev. Vit. 48: 393-394. 1918.—Used “liver of sulfur” 500 grams per hectol with 500 grams soft soap. Two treatments with this equaled three treatments with dry sulfur. Notwithstanding author thinks dusting will continue preferable.—Trials with a mixture of lime-sulfur solution and bordeaux mixture for *Oidium* and *Plasmopara* gave promising results. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 1001-1002. 1918.]

1347. CHRISTENSON, C. I. [The selection of some varieties of swede resistant to *Plasmiodiophora brassicae*, in Denmark.] Tidsskr. Plant. 26: 68-82. 1917.—Two varieties more resistant than “Pioneer” are recorded. Resistance is shown to be heritable. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 317-319. Fig. 3. 1918.]

1348. DOSDALL, LOUISE. Overwintering of the aeciospores of *Cronartium ribicola* Fisher. Phytopath. 8: 619. 1918.—Aeciospores obtained from deep aecial scars on a dead pine branch and believed to be spores which were produced one year previous gave from 1 to 2 per cent germination in sterilized distilled water.—W. H. Rankin.

1349. ELLIOTT, JOHN A. Wood-rots of peach trees caused by *Coriolus prolificans* and *C. versicolor*. Phytopath. 8: 615-617. 2 fig. 1918.—Field observations on wood-rots following severe pruning within a small area in Arkansas. *Picnoporus cinnabarinus* and *Schizophyllum commune* although common are believed to be of secondary importance. Trees died within three years after pruning. Probable correlation between the severity of the injury and low heavy soil is suggested.—W. H. Rankin.

1350. FRACKER, S. B. Crown gall on young apple trees. Wisconsin Hortie. 8: 139. 1918.—Studies in Wisconsin nurseries indicate that the disease reduces the strength and size of the tree during nursery life from 15 to 20 per cent.—James G. Dickson.

1351. GLOVER, H. M. An unidentified fungus injurious to the conifer *Cedrus deodara* in India. *Indian Forester* 43: 498-499. Pl. 1. 1917.—Roots of plants about 1 foot high are attacked and the trees die. [Through abst. in *Internat. Rev. Sci. Pract. Agric.* 9: 519. 1918.]

1352. HARA, K. [Japanese.] [Dark-spot of summer orange (*Citrus aurantium* var. *sinensis*)]. *Qua-Ju* [Fruit culture] No. 188: 22-24. Fig. 1-3. 1918.—Studies on the dark-spot disease caused by *Cercospora* sp. on the living leaves of Summer orange (afterwards it was found to be Dai-Dai orange *C. aurantium* var. *amara*). Spots dark, round, 5 to 10 mm. in diameter more numerous near the edge of leaf. Advises spraying two to three times with bordeaux mixture in June.—S. Hori.

1353. HILEY, W. E. *Chrysomyxa abietis* in England and Scotland. *Quart. Jour. Forestry* 11: 191-192. 1917.—First record for England. [Abst. in *Internat. Rev. Sci. Pract. Agric.* 9: 398. 1918.]

1354. HORI, S. [Japanese.] [The unusual out-break of the stripe disease caused by *Helminthosporium gramineum* Rabh. on barley in 1918.] *Nōgyō Sekai* [The Agricultural World] 13⁴: 20-28. 1918.—According to the report from the Department of Agriculture, the anticipated production of barley in 1918 was to be diminished about 24 per cent against the annual average, on account of the unfavorable climatic condition. In the late Spring and thenceforth the out-break of stripe-disease on barley was reported from the several prefectural experiment stations and from growers. The author has estimated, on a comparatively exact basis, the loss by the disease at about 800,000 Koku (about 4,092,000 American bushels) or one-third of supposed reduction. In 1896, the disease was severe in Provinces Awa and Mikawa, and author gave the explanation in *Bull. Centr. Agric. Exp. Sta.* 14: 134-140. 1899. It is generally accepted that late sowing is likely to bring on the disease; in the last autumn the temperature suddenly decreased at the proper sowing time and during the winter the climate was cold and dry, so that the result was the same with the late sowing, i.e., it retarded the germination and growth of barley.—The Jensen's hot water treatment may perfectly prevent the disease and it already has been proved experimentally.—S. Hori.

1355. HORI, S. [Japanese.] [Lecture on mulberry diseases.] *Byo-chu-gai Zasshi* [Jour. Plant Protec.] 4: 827-833, 915-920. 1917. *Ibid.* 5: 10-15, 93-95, 173-177, 251-255, 333-338, 423-427, 515-519. 1918.—Lecture on the principal diseases of Japanese mulberry, delivered to the sericulturist's class held at Uyeda, Nagano prefecture in November, 1916. It contains introduction, general relations to the environmental factors, parasitic diseases, non-parasitic diseases, and methods of control.—S. Hori.

1356. HUTCHINSON, C. M. [*Pseudomonas tritici* n. sp., injurious to wheat in the Punjab.] *Mem. Dept. Agric. India, Bact. Ser.* 1: 169-175. Pl. 1-4. 1917.—"Its principal characteristics are very similar to those described by Rathay and O'Gara for *Dactylis glomerata* and *Agropyron smithii* respectively." [Through abst. in *Internat. Rev. Sci. Pract. Agric.* 9: 630-631. 1918. Abst. in *Exp. Sta. Rec.* 39: 454. 1918.]

1357. ISHIKAWA, T. [Japanese.] [New preventive method for bacterial wilt and stem rot of egg-plant.] *Byo-chu-gai Zasshi* [Jour. Plant. Protec.] 5³: 20-25. 1918.—Conclusion of the three years experiments in the Niigata prefectural experiment station. It is proved that the application of lime-sulphur solution gives better results than use of wood ashes, lime, lime-nitrogen, formalin, etc. Two or three days before transplanting the seedlings, spray and thoroughly mix the soil with lime-sulphur solution (1°B.) at rate of 2 American gallons for 6 square feet of ground. Spray with 0.6°B. solution, in June to July, once or twice over, the surface of the soil near the roots.—S. Hori.

1358. KEITT, G. W. Control of cherry leaf spot in Wisconsin. *Wisconsin Agric. Exp. Sta. Bull.* 286: 1-11. 1918.—Leaf spot is the most destructive fungus disease of the cherry in Wisconsin. Control measures recommended are: Early clean cultivation turning under

the dead leaves; and spraying with Bordeaux, lime-sulphur or other standard spray (1) when the petals fall, (2) about two weeks later, (3) if necessary just after fruit is picked. [Abst. in Wisconsin Agriculturist 42: 19. Mar. 8, 1918. Also in Wisconsin Hortic. 8: 117. Apr., 1919.]—James G. Dickson.

1359. KINSHOVEN, J. Schädlinge des Gemüsebaues und ihre Bekämpfung. [Enemies of vegetables and their control.] Flugschr. Deutsch. Landwirtschaftsges. 13. 6 Ed. 32 p. Berlin, 1917.—Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 37. 1918.

1360. LINDFORS, THORE. [Verticillium albo-atrum a hyphomycete causing "vissnes juka" (wilt) of cucumber in Sweden.] Land. Akad. Hand. och Tids. 57: 627-636. 2 fig. 1917.—"V. albo-atrum is specific agent of wilt; its hyphae easily enter living tissue of both mature and young plants, and develop in large number in the vessels, which they stop up more or less completely."—Ascochyta cucumis produces a leaf-spot but no wilt.—Fusarium sclerotoides and F. redolens var. angustius do not cause wilt, but may give rise to a kind of stem-rot.—Disinfection of soil is not accomplished with 2 per cent potassium permanganate. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 634-635. 1918.]

1361. MCCLINTOCK, J. A. [The resistance of peanuts to Sclerotium rolfsii.] Science 47: 72-73. 1918. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 517-518. 1918.] [See Bot. Absts. 1, Entry 334.]

1362. MOREILLON, M. [Diaporthe taleola, an ascomycete injurious to oaks, in Switzerland.] Jour. For. Suisse 69: 1-3. Pl. 1. 1918.—Following light wind in September author found as many as ten branches per square meter, measuring as much as 1 cm. in diameter and nearly 50 cm. in length, caused to drop by action of this fungus. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 397-398. 1918.]

1363. NISHIDA, T. [Japanese.] [Stippen or bitter-pit of apple.] Byo-chu-gai Zasshi [Jour. Plant Protec.] 5: 520-526. 1918.—Author has given the Japanese name "Hi-yak" disease for stippen or bitter-pit of apple. It resembles in all respects a disease of Japan plum (Terada plum) which the author is investigating with special interest. For comparison, the stippen of apple is described.—S. Hori.

1364. NISHIDA, T. [Japanese.] [Water supply of the soil in relation to fruit diseases.] Byo-chu-gai Zasshi [Jour. Plant Protec.] 5: 801-806. 1918.—Stippen of Japan plum is entirely due to the high fluctuation of water supply of the soil at the growing season of fruit. This was proved by the experiment carried on at Terada, Pref. Kyoto. The disease was entirely prevented by the application of stable manure and by covering ground with rice straw. After observing the occurrence of stippen on apple in Korea and several apple districts of Hondo, author advises the regulation of water supply of orchard by applying stable or green manure, etc. and by other methods.—S. Hori.

1365. NOMURA, Y. [Japanese.] Splits of the navel orange. En-gei no Tomo [The Horticulturist's Friend] 14: 815-820. 1918.—Observations on the splits of the navel orange in the orange districts of Kochi Prefecture. It has close relation to the shape and size of fruit and to the climatic conditions especially during the growing season of fruit—September to October. Long fruit splits least, round much, and flat more. Relation to rainfall is proved by meteorological observations. In the rational orchard the damages are least.—S. Hori.

1366. PATOUILLARD. [Observations on the parasitism of the ascomycete, Ustilina vulgaris, in France.] Bull. Soc. Path. Vég. France 4: 100. 1917.—Fungus killed two lime trees in Ain. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 772. 1918.]

1367. PEGLION, VITTORIO. [Observations on hemp mildew (Peronoplasmopara cannabina) in Italy.] Rend. R. Accad. Lincei (Cl. Sci. Fis., Mat. e Nat.) 26: 618-620. 1917.—Disease of little consequence except in rare instances. Life history, morphology and taxonomy of fungus. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 118-119. 1918.]

1368. PESTICO, J. F. ["Fucha" of the cotton plant in the department of Boyacá, Republic of Colombia.] Riv. Agric. 4: 113-116. 1 fig. 1918.—"The disease is characterized by numerous small swellings on the leaves and young branches and, more rarely, on the flowers. It usually becomes visible after prolonged rains and diseased plants fade and die one or two weeks later." Lack of good cultural practice is said to cause the appearance of the disease. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 998. 1918.]

1369. PETHYBRIDGE, GEORGE H., AND H. A. LAFFERTY. A disease of flax seedlings caused by a species of *Colletotrichum*, and transmitted by infected seed. Sci. Proc. Roy. Dublin Soc. 15: 359-384. Pls. 19-20. 1918.—Disease has been reported as "yellowing" but the author regards damping-off a more appropriate name. The causal organism is *C. linicolum* n. sp. It hibernates as mycelium in the cells of the epidermis of the seed-coat. Seedlings are infected during or subsequent to seed-germination. Control is accomplished by the application of a mixture of finely powdered copper sulfate crystals and dry sodium carbonate to slightly moistened infected seed. The disease is believed to be widespread over the globe, flax-seed from Russia, Holland, Canada, United States of North America and Japan giving rise to diseased seedlings.—L. R. Hesler.

1370. RORER, J. B. [The South American Hevea leaf disease in Trinidad.] Bull. Dept. Agric., Trinidad a. Tobago 16: 128-129. 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 253-254. 1918.]

1371. SALOMON, RENÉ. [Vines offering a relative resistance to mildew.] Rev. Vit. 47: 314-316. 1917.—[Through abst. (naming the varieties and their relative resistance) in Internat. Rev. Sci. Pract. Agric. 9: 117-118. 1918.]

1372. SCHANDER. Welche Ursachen bedingten die geringe Kartoffelernte im Jahre 1916 und was können wir daraus lernen? [What causes contributed to the reduced yield of the potato in the year 1916 and what we can learn from them?] Landw. Centralbl. Prov. Posen Heft. 12. 1917.—[Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 41. 1918.]

1373. SCHANDER. Einfluss der Bodenbearbeitung, Düngung u. s. f. auf den Ertrag und den Gesundheitszustand der Kartoffeln. [Influence of soil-treatment, fertilization, etc. on the yield and health of the potato.] Landwirtschftl. Centralbl. Prov. Posen. H. 14. 5 p. 1917.—Abst. by Matouschek in Zeitschr. Pflanzenkr. 28: 40-41. 1918.

1374. SCHÖYEN, T. H. Om skadeinsekter og snyltesopp paa skogtræerne i 1915. [On the injurious insects and fungi of forest trees in 1915.] Skogdirectörens indberetning for kalenderaaet 1915: 154-159. Pl. 1. Kristiania, 1917.—*Phytophthora omnivora*, *Brunchorstia destruens* (*Crumenula abietina*) and *Fusoma pini* mentioned. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 33-34. 1918.]—W. H. Rankin.

1375. SCHÖYEN, T. H. Statsentomolog T. H. Schøyens beretning. 1916. [Fungi, insects and animals injurious to cultivated plants in Norway in 1916.] Aarsberetning angaaende de offentlige foranstaltninger til landbrucksfremme i Aaret 1916: 39-94. 24 fig. 1917.—Abstract of the Norwegian law of 1916 for the suppression of diseases and pests. A penalty is imposed on those who fail to report diseases, etc. *Berberis vulgaris* is to be destroyed. *Puccinia graminis*, *Synchytrium endobioticum* and *Sphaerotheca mors-uvæ* are considered injurious to agriculture.—Record of diseases of various crops.—Experiment for control of *Sphaerotheca mors-uvæ* showed formaldehyde, 1.6 per cent solution, most effective. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 31-33. 1918. Also through abst. in Internat. Rev. Sci. Pract. Agric. 9: 514-517. 1918.]

1376. SETCHELL, WILLIAM A. Parasitism among the red algae. Proc. Amer. Phil. Soc. 57: 155-172. 1918. [See Bot. Absts. 1, Entry 767.]—"Parasites among the members of the Rhodophyceae, or Red Algae, are becoming more and more known. The author has been paying special attention to these parasites for some years. Of some 51 species, old or new,

known to be wholly or partially parasitic, 39 are on plants of the same family of Red Algae, 8 others are on Red Algae not of the same family but with some on hosts fairly nearly related, while only 4 are parasitic on hosts belonging to other groups (brown or green algae). These facts seem significant as to the origin of these parasites. The epiphytic red algae often penetrate the host plant which is commonly also one of the Red Algae, but also may be either brown or green. Some light may be thrown on the origin of red parasites, particularly of those parasitic on close relatives by the behavior of the tetrasporangia of *Agardhiella tenera*. As described by Osterhout in 1896 the zonate tetrasporangia germinate as a whole even after division into tetraspores, and produce dwarf unbranched plantlets which penetrate the tissues of the parent plant by basally produced rhizoids. The plantlets produced are largely antheridial, but some are cystocarpic and some even tetrasporic. Such mutations as these plantlets of *Agardhiella* seem to represent, accompanied by a greater or less degree of chlorosis, go far toward indicating a possible origin of these parasites on closely related hosts." [Through author's abst. in Science 47: 620. 1918.]

1377. SHREVE, FORREST. Cultures of mistletoe. [Rev. of: Weir, James R. Experimental investigations on the genus *Razoumopkya*. Bot. Gaz. 66: 1-31. 1918.] Plant World 21: 159. 1918. [See Bot. Absts. 1, Entry 1648.]

1378. STEBLER, F. G., A. VOLKART, AND A. GRISCH. Samenuntersuchungen vom 1. Juli 1915 bis 30. Juni 1916 und Versuchstätigkeit für das Jahr 1916. [Seed investigations from July 1, 1915, to June 30, 1916, and research activities for the year 1916.] Jahresber. Schweiz. Samenuntersuchungs- und Versuchsanstalt in Oerlikon-Zürich 39: 1-34. 1917.—A disease of rye caused by a species of *Fusarium* was very common and destructive. The stem-scorch of red clovers caused by *Gloeosporium caulivorum* was observed once. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 30. 1918.]—W. H. Rankin.

1379. TAUBENHAUS, J. J. On a sudden outbreak of cotton rust (*Aecidium gossypii*) in Texas. Science 46: 267-269. 1917.—Abst. in Internat. Rev. Sci. Pract. Agric. 9: 518-519. 1918.

1380. TUNSTALL, A. C. The spraying of tea in north-east India. Agric. Jour. India (Special Indian Science Congress Number). P. 73-80. 1918.—An account of the improvements in machinery and in organization necessary to make spraying practicable in tea gardens. Plants are sprayed in dormant condition with caustic soda to remove epiphytes. Strengths above 2 per cent are harmful. Preventive treatments during growing season interfere with tea culture because of habit of growth and nature of product.—Plans have been made for disease patrols similar to fire patrols who will on occasion stamp out incipient epiphytotics.—Types of knap-sack sprayers, nozzles, spray mixtures, etc., have been tested.

1381. UZEL, H. Zum Verziehen der Zuckerrübe. [On the distortion of sugar-beets.] Blätter für Zuckerrübenbau 24: 138-139. 1917.—Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 41. 1918.

1382. VAUGHAN, R. E. Potato seed treatment—Lessons from 1917. Wisconsin Potato Growers' Assoc. Bull. 3: 60. 1918.—Corrosive sublimate—1:1000—recommended in potato seed treatment as it is more effective than formaldehyde against *Rhizoctonia* and equally as good for scab (*Oospora*) and black leg (bacterial).—James G. Dickson.

1383. VOGLINO, P. [Bacteria and fungi recorded as parasitic on cultivated plants in the province of Turin and adjacent regions in 1916]. Ann. R. Acad. Agric. Torino 40: 205-229. 1918.—A review listing 110 diseases caused by bacteria and fungi.—A service of "preventive detection" for vine mildew is described. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 909. 1918.]

1384. YORK, H. H., AND PERLEY SPAULDING. The overwintering of *Cronartium ribicola* on *Ribes*. Phytopath. 8: 617-619. 1918.—Urediniospores from dead leaves remaining on

the bushes over winter were used to inoculate *R. nigrum* in greenhouse in April. One uredinium developed. A similar experiment in another greenhouse yielded seven sori. Also urediniospores from specimens placed in herbarium for one year produced two sori on inoculated plants. A single spore from unbroken urediniosorus on the herbarium material was observed to germinate under the microscope. These results are believed to indicate that *C. ribicola* may occasionally overwinter on dead *Ribes* leaves.—W. H. Rankin.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

1385. ANONYMOUS. Note on a new oil-containing fruit. Mexican Notes, March 2, 1918.—A new fruit "chichopoxtle," containing a large amount of fatty oil has been found growing in the region of Torreon. Since the oil proved to be a lubricant of high quality and occurs in quantities amounting to 25 per cent, the cultivation of this oil fruit on a large scale is planned. No scientific name is given. [Through abst. in Chem. News 117: 223. 1918.]—Arno Viehoveer.

1386. GRIEBEL, C. Contributions to the microscopy of coffee substitutes (especially spurry and locust seeds.) Zeitschr. Nahrungs- u. Genussmit. 35: 272-277. 1918.—Among the numerous coffee substitutes chicory and beets play the main rôle. In addition however waste products have been used like potato pulp, husks of grapes or other fruits, tree bark, the stony part of fruitshells and kernels or stonefruits of plants such as hawthorn, rose, etc. Spurry as well as locust seeds have been used as coffee substitutes and Griebel discusses them in detail.

1. Spurry (*Spergula arvensis*, Caryophyllaceae), growing quite generally as a weed on sandy soil, is under cultivation for feed in Western Germany. The black seeds are a little larger than 1 mm., spherical in diameter, somewhat compressed and surrounded by a small light wing. The seed surface is minutely warty and more or less covered with thick, club shaped, hair like structures of gray brown color. The appearance of the testa epidermis, as is the case with that of other caryophyllaceae, is characteristic for microscopic identification representing black brown cells with thick walls, the outlines showing wavelike curves. Some of these cells are grown out to the thick walled, hair like structures referred to. These structures are covered with warts which are formed somewhat like a sucking bowl. The remaining tissue is not especially characteristic except possibly that of the wing in so far as the epidermis cells here also have small wartlike thickenings. Illustrations are given of the structures referred to.

2. Locust seed (*Robinia Pseudo-Acacia*, Leguminosae). Repeated feeding of locust seeds to mice showed, contrary to previous belief, their nonpoisonous character. The anatomy of the 6 mm. long, brown seeds is not different from the structure generally characteristic for Leguminosae. The seed-coat consists of slender palisade cells, 90 to 100 μ high, of column cells, about 30 μ high and of endosperm, formed by a layer of cells containing aleurone masses and another inner layer of cells with somewhat mucilaginous walls. The tissue of the cotyledons contains besides protein, some fat but no starch. The regular, long and slender cells are especially characteristic for the roasted and ground product. Drawings are given, illustrating the observations recorded.

3. Seeds of *Gleditsia triacanthos* (American bean tree). Griebel makes the suggestion that possibly also these seeds could be used as coffee substitute, since they were fed to mice and eaten by other animals without injury. The seeds are flat, egg shaped and may be as large as 1 cm. (The presence of alkaloids in the seeds of this species has been reported and again been disputed.)—Arno Viehoveer.

1387. KOFLER, LUDWIG. Typha as a starch plant. Zeitschr. Unters. Nahrungs- u. Genussmit. 35: 266. 1918.—Of the 5 species of Typha indigenous to Middle Europe, Typha latifolia, T. angustifolia, T. minima, T. Shuttleworthii, T. gracilis, only T. latifolia has prac-

tical value. The plant or certain parts have already in previous times been used for technical as well as medicinal purposes. Of special interest is the use of the rhizome as food in Asia, New Zealand and North America. The rhizomes especially in fall or winter are filled with starch. Loges found in the dried material 46 per cent of starch, while Thoms isolated only 30 per cent from rhizomes that had been collected in spring and showed some young growth.—Detailed description of the rhizomes, roots and runners is given and the characteristics of the powder are pointed out. Two distinct kinds of starch grains were observed: large grains, monarch to triarch, a single grain measuring about 13μ in diameter, the point of origin, if visible, centrally located, lamellae not visible; small grains, monarch to polyarch, usually monarch, 3.5μ average diameter. The tracheae have ladder-like thickenings, the sclerenchyma bundles consist of fibers with walls only very little thickened and with pits oblong and arranged at 45° to the longitudinal axis. The star shaped parenchyma, forming part of the bark, contains only the small starch grains. Of especial diagnostical value are also cells called "Inklusen." These are rather uniformly, though not abundantly, distributed throughout the tissue and contain, bedded in a gummy groundmass, phloroglucinol and catechin derivatives of a tanninlike nature. Sections or powder treated with p-dimethyl-amidobenzaldehyd and sulphuric acid colors these cells wine red, while the other tissue remains colorless. Illustrations are included showing some of the characteristics mentioned.—The striking characteristics of other plant products, such as *Pteridium aquilinum*, *Cyperus*, *Asphodeles*, *Scirpus* and *Juncus* are also very briefly mentioned. [See next following Entry, 1388.]-Arno Viehoveer.

1388. KOFLEK, LUDWIG. Note on the eagle fern, *Pteridium aquilinum*. Since with the usual methods of analysis no poisonous substance had been found by some other investigators, this fern was collected in large amounts for use in food or feed. Bread was prepared containing a considerable amount. The consumption of this bread, especially in Bosnia, caused serious injuries and in a number of cases even death. The rootstocks of *Pteridium aquilinum* contain starch grains with oblong and irregular shape, tracheae with bordered pores and a brown, strongly suberized rind. (Of interest is that Greshoff found a cyanogenetic amygdalin-like glucoside in *Pteris aquilina* L., a plant which is now considered synonymous with *Pteridium aquilinum* Kuhn. Only mature plants were found to yield no hydrocyanic acid.) [See next preceding Entry, 1387.]-Arno Viehoveer.

1389. WEEHUIZEN, M. F. On the phenol of the leaves of *Coleus amboinicus* Lour. (*C. carnosus* Hassk.) Recueil. Trav. Chim. Pays Bas et Belgique 37: 355-356. 1918.—The leaves of *Coleus amboinicus* Lour (Labiatae), a much desired medicinal plant, indigenous to Java, have a distinct aromatic odor which is due to an ethereal oil present in small amounts. While Boorsma previously had obtained 0.055 per cent, Weehuizen after distilling 120 kilos of the fresh herb found only about 25 cc. or about 0.021 per cent of ethereal oil. The low yield is attributed to the presence of stems, which do not contain any volatile oil. From the ethereal oil a phenolic substance was isolated which could be identified as carvacrol. The melting point of the carvacrolphenylurethane was found to be 134° - 135° , thus agreeing with data given by Goldschmidt and not with other data in literature, stating the compound to melt at 140° .—Arno Viehoveer.

PHYSIOLOGY

B. M. DUGGAR, Editor

[Unsigned abstracts are by the editor.]

GENERAL

1390. ANONYMOUS. Suitable storage conditions for certain perishable food products. U. S. Dept. Agric. Bull. 729. p. 10. 1918.

1391. ROGERS, L. A. The occurrence of different types of the colon-aerogenes group in water. Jour. Bact. 3: 313-328. 1918.—An attempt to determine (1) the fate of the two chief

forms of the fecal bacillus in water in respect to multiplication and attenuation, and (2) if a colon isolation necessarily indicates fecal contamination. The *Bacillus-aerogenes* type is found to survive unfavorable conditions longer than *B. coli*, and some data are furnished regarding the effect on physiological cultural characters of the exposure to such conditions. Evidence in regard to the second point is not yet final. It is believed that material assistance in methods is assured by the ability to separate the colon-aerogenes group into varieties.

1392. SMITH, ANNIE L. The relation of fungi to other organisms. Trans. Brit. Mycol. Soc. 6: 17-31. 1918.—A presidential address with discussion of the literature on phases of parasitism, methods of parasitic attack, reaction of the host cell, and symbiosis.—S. M. Zeller.

1393. TRUOG, E. Soil acidity: 1. Its relation to the growth of plants. Soil Science 5: 169-195. 1918.—This is a general article which draws to the attention of physiologists and agronomists the complexity of the problems relating to soil acidity, a condition which is considered to have many indirect and general influences on the growth of plants due to a relation of physical, chemical, and biological soil factors. In the discussion of soil acidity the following points receive consideration, namely: general fertility, prevalence of plant diseases, competitive powers of plant species, the relation of available calcium to the symbiotic nitrogen-fixing bacteria and to the root tissue of the plants.

WATER RELATIONS

1394. HARRINGTON, GEORGE T., AND WILLIAM CROCKER. Resistance of seeds to desiccation. Jour. Agric. Res. 14: 525-532. 1918.—Using seeds of Gramineae the authors were able to corroborate the results of Pickholz and Waggoner and (in part) to controvert those of Ewart. It was shown that the germination capacity of a number of grasses was not changed when the seed had been dried in vacuo over calcium oxide to 1 per cent or less of moisture. Careful determinations were made of germination energy as well as germination capacity, the former being more readily affected than the latter.

1395. LIVINGSTON, B. E. Porous clay cones for the auto-irrigation of potted plants. Plant World 21: 202-208. 1918.—A modification of the cylindrical porous cup method devised especially to overcome the difficulty of imperfect soil contact. An important feature of the new device is that it is conical; the widest portion may impinge against the narrower basal portion of the side wall of the pot, and the neck with cork, etc., projects above the soil. Such an arrangement with an oblique porous surface insures contact with the shifting or slipping soil, and at the same time furnishes a large water-supplying surface. The remainder of the mechanism follows the plan of the older device except that an arrangement is included for liberating contained air and for emptying the system.

MINERAL SALT RELATIONS

1396. HEADDEN, W. P. Alkalies in Colorado (including nitrates). Colorado Agric. Exp. Sta. Bull. 239. 58 p. 1918.—A popular account of the problems of alkali in agriculture, using term "alkali" to designate all soluble salts (including nitrates) found in the soil. Discusses the source of the various salts and their transport by streams. Includes summary of author's views upon harmful action of excess of nitrate, in which it is stated that harmful amounts of nitrates are formed by the agency of *Azotobacter*. "White alkali," consisting of sulphates and chlorides of sodium, calcium, and magnesium, is not regarded as harmful to cultivated plants. "Black alkali," consisting of sodium carbonate, is held to be dangerous only where drainage conditions are poor.—H. S. Reed.

1397. REED, HOWARD S. Absorption of sodium and calcium by wheat seedlings. Bot. Gaz. 66: 374-380. Fig. 1. 1918.—For the tests reported wheat seedlings were grown on disks of perforated aluminum floated by glass bulbs on solutions of the same composition as those

in the experiments. Special precautions were taken to prevent contamination through dust and chemical injuries. The experiments were designed primarily to determine the value of some of Osterhout's proportions in weak solutions supplemented by analyses which should indicate the amount of the solutes absorbed. The results indicate that the antagonism of calcium and sodium exists in extremely dilute solutions (230 to 4000 parts per million) and the most successful antagonism in the solutions employed was 98:2. This ratio seemed not to exclude the sodium from entrance but rendered it harmless, and is considered an internal effect rather than a peripheral effect.

1398. WINSLOW, C. E. A., AND I. S. FALK, Studies on salt action. I. Effect of calcium and sodium salts upon the viability of the colon bacillus in water. *Proc. Soc. for Exp. Biol. and Med.* 15: 67-69. 1918.—A study of the antagonistic influence of calcium and sodium chloride in order to secure a viability curve, the latter being found to be much the same for this bacillus as for higher forms of life. [See *Bot. Absts.* 1, Entry 177.]

METABOLISM (GENERAL)

1399. HASSELBRING, HEINRICH. Effect of different oxygen pressures on the carbohydrate metabolism of the sweet potato. *Jour. Agric. Res.* 14: 273-284. 1918.—Since from earlier studies evidence had been adduced to the effect that reducing sugar in the sweet potato is an intermediate product in the transformation from starch to cane sugar under storage conditions this investigation was undertaken in the hope of further separating the various steps in this process. The method of study consisted in halving lengthwise the freshly dug sweet potatoes, utilizing one set of halves for immediate analysis and storing the other under experimental conditions, the latter being subjected to gas pressures, varying from several atmospheres to less than one atmosphere. Among the results are to be noted (a) the killing action on the tissues of gas pressures of five atmospheres or more, (b) the demonstration that starch and cane sugar hydrolysis are independent of free oxygen supply, and (c) the greater consumption of material by the sweet potato and a greater CO₂ output in anaerobic respiration than in normal respiration—the time and temperature factors being comparable.

1400. HUGHES, J. S. Some nutritive properties of corn. *Kansas Agric. Exp. Sta. Tech. Bull.* 5. 39 p., 9 fig. 1918.—A physiological study of the effects upon animals of the constituents of maize grain. Corn grain alone is an adequate diet for adult pigeons for maintenance, at least during a period of one year. Corn bran contains relatively large amounts of antineuritic substances similar to those called vitamins by Funk, and water-soluble B by McCollum. However, a diet of corn + synthetic salt mixture was not adequate for normal growth of chickens. Corn + synthetic salt mixture + casein formed a suitable ration, but if the casein were extracted with alcohol and ether or autoclaved, it lost its value. The loss of efficiency is probably due to destruction of accessories.—*H. S. Reed.*

1401. JOHNSON, B., AND R. W. HOVEY. The determination of cellulose in wood. *Jour. Soc. Chem. Indust. (Trans.)* 37: 132-137. 1918.—A modification of Cross and Bevan's chlorination method is described, which chiefly differs from theirs in that the cellulose is hydrolyzed by a mixture of acetic acid and glycerin (in equi-molecular proportions) at 135°C. before chlorination. The results of analyses of different woods are given and variations in cellulose content in different parts of the same tree are recorded. A number of analyses are also given in regard to other substances in wood—namely, lignin, the substances yielding furfural, and other carbohydrates of comparatively low molecular weight. [Through *abst.* by W. S. in *Physiol. Absts.* 3: 282. 1918.]—*S. M. Zeller.*

1402. KRAUS, E. J., AND H. R. KRAYBILL. Vegetation and reproduction with special reference to the tomato. *Oregon Agric. Exp. Sta. Bull.* 149. 90 p., 22 fig. 1918.—One of a series of investigations on the problem of pollination of the pomaceous fruits considered from the physiological and bio-chemical standpoint. Four general conditions of the relation of nitrates, carbohydrates, and moisture within the plant itself, and the responses apparently

correlated therewith are discussed. These are: (1) Though there be present an abundance of moisture and mineral nutrients, including nitrates, yet without an available carbohydrate supply vegetation is weakened and the plants are non-fruitful; (2) An abundance of moisture and mineral nutrients, especially nitrates, coupled with an available carbohydrate supply, makes for increased vegetation, barrenness, and sterility; (3) A relative decrease of nitrates in proportion to the carbohydrates makes for an accumulation of the latter, and also, for fruitfulness, fertility, and lessened vegetation; (4) A further reduction of nitrates without inhibiting a possible increase of carbohydrates, makes for a suppression both of vegetation and fruitfulness. Results of recent investigations on cultivation and companion cropping, nitrogenous fertilizer applications, and pruning are examined in the light of these four general conditions. The literature dealing with a suggested relationship between plant responses and the availability of elaborated and non-elaborated food is reviewed. The experimental data deals with a comparative study of the internal conditions in tomato plants which were setting fruit and those which were not, particularly with reference to the presence of total nitrogen, nitrates, moisture and carbohydrates and the relations between them. Extensive chemical and micro-chemical determinations of moisture, dry matter, total nitrogen, free reducing substances, sucrose and starch were made on stems and leaves of tomato plants growing for varying periods under varying nutrient conditions. Plants grown with an abundant supply of available nitrogen and the opportunity for carbohydrate synthesis, are vigorously vegetative and unfruitful. Plants grown with an abundant supply of nitrogen and then transferred and grown with a moderate supply of available nitrogen are less vegetative but fruitful. Plants grown with an abundant supply of nitrogen and then transferred and grown with a very low supply of available nitrogen are very weakly vegetative and unfruitful. When plants which have been grown with a large supply of available nitrogen and moisture are subjected to a reduced moisture supply just about the wilting point there is a decrease in vegetative activity. Whatever the conditions under which a plant has been grown, considering the whole plant as a unit, increased total nitrogen and more particularly increased nitrate nitrogen are associated with increased moisture and decreased free-reducing substances, sucrose, polysaccharides, and total dry matter. Fruitfulness is associated neither with highest nitrates nor highest carbohydrates, but with a condition of balance between them. There is a correlation between moisture content and nitrate nitrogen. In general, within the plant itself, in the stem from the top to bottom, there is a descending gradient of total nitrogen and moisture, and an ascending gradient in total dry matter, polysaccharides and sucrose. The proportion of free-reducing substances to other carbohydrates, total nitrogen, and nitrate nitrogen is variable. The available carbohydrates constitute as much of a limiting factor in growth as the available nitrogen and moisture supply. The conditions for the initiation of floral primordia and even blooming are probably different from those accompanying fruit setting. Fruit production is seemingly a specialized vegetative function usually more or less closely associated with the function of gametic reproduction. Until more exact information is available, both environmental and hereditary factors must be considered in any attempted explanation of the reproductive or vegetative behavior of plants.—*E. W. Bailey.*

1403. NAKASEKO, ROKURO. Approximate determination of protein in physiological fluids. *Mem. Coll. Sci. Kyoto Imp. Univ.* 3: 93-112. 1918. [Through abst. by Joseph S. Hepburn in *Chem. Absts.* 3: 1887-1888. 1918.]

1404. O'NEILL, P., AND A. G. PERKINS. The coloring matters of camwood, barwood, and sanderswood. *Jour. Chem. Soc. (Trans.)* 113: 125-140. 1918.—These dye woods and calaturwood give very similar red dyes. Camwood gives to mordanted wood somewhat bluer tones than the other three. The more insoluble coloring matter is isosantalol, $C_{22}H_{18}O_5(OMe)_2$, and is isomeric with the santalol of sanderswood. The coloring properties of barwood are identical with the latter. [Through abst. by W. S. in *Physiol. Absts.* 3: 282. 1918.] —*S. M. Zeller.*

MISCELLANEOUS

1405. BIGELOW, W. D. Scientific research in the canning industry. Jour. Franklin Inst. 186: 1-14. 1918.

1406. CLARK, A. W. AND L. DU BOIS. "Jelly value" of gelatin and glue. Jour. Indust. and Engin. Chem. 10: 707-709. 1918.

1407. GORTNER, R. A. AND E. H. DOHERTY. Hydration capacity of gluten from "strong" and "weak" flours. Jour. Agric. Res. 13: 389-419. 1918.

1408. KOESSLER, J. K. Studies on pollen and pollen disease. I. The chemical composition of ragweed pollen. Jour. Biol. Chem. 35: 415-424. 1918.—Walls of pollen grains do not disintegrate after boiling 15 minutes in 15 per cent. HCl or after digestion with trypsin at 37°C. for 24 hours. An extract was made which was active on hayfever patients. It was expressed from 11 gms. of pollen which had been in 300 cc. of 8.5 per cent. NaCl at 37°C. for 10 hours, and gave the ordinary protein tests. The amount of nitrogen present in the pollen is 4.72 per cent. The highest possible protein content would be 11.37 per cent. The water content is 10.5 per cent and the ash 10.6 per cent. Reducing sugars, 6.89 per cent. Ether soluble lipoids, 10.3 per cent. Insoluble in ether but soluble in 95 per cent alcohol, 12.5 per cent. Extractives soluble in alcohol and water, 11.5 per cent. Insoluble residue, 37.71 per cent. [See Bot. Absts. 1, Entry 719.]—C. H. Farr.

1409. SHARPLES, A. The lactiferous system of *Hevea brasiliensis* and its protective function. Ann. Bot. 32: 247-257. 1918.—In spite of the long accepted belief that the gum is inhibitive against insect and fungous attacks, experiments show that the corky layer of bark is the important protective agent and not the lactiferous layer; for, if the green cork cambium is left undisturbed the susceptibility to attack is less than when removed. In tapping the limiting factor is the rapid removal of the bark, which disturbs the inner cortical tissues and does not give sufficient time for renewal, but not the quantity of sap taken. The open problem is whether the latex is a waste product, the removal of which does not affect the living processes of the tree, or whether it is an essential product, the removal of which stimulates increased replacement activity.—S. M. Zeller.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*.

BRYOPHYTES

1410. ANDREWS, A. LEROY. A collection of mosses from North Carolina. Bryologist 21: 61-67. 1918. This is a list of species determined from collections made mostly by Prof. G. F. Atkinson in 1901 at various points in the Blue Ridge and Black Mountains. The data include only the localities and collection numbers.—E. B. Chamberlain.

1411. BRITTON, ELIZABETH G. Mosses from Florida collected by Severin Rapp. Bryologist 21: 27-28. 1918.—This is a brief notice of the recent discovery in Florida of the occurrence of certain species of tropical mosses. New combinations occur in *Semalophyllum* and *Raphidostegium*.—E. B. Chamberlain.

1412. BRITTON, E. G. "The Catkin-Hypnum with long hoses." Bryologist 21: 32. 1918.—The paper notes a distinguishing character of *Leucodon julaceus*, and the range of Austin's "forma stolonifera" of the same species.—E. B. Chamberlain.

1413. BRITTON, E. G. *Jaegerinopsis squarrosa*, n. sp. Bryologist 21: 48-50. Pl. 24. 1918.—A sterile species of moss from Cuba and Florida is described and figured as new.—E. B. Chamberlain.

1414. BRITTON, E. G. Further notes on *Jaegerinopsis*, Broth. Bryologist 21: 80. 1918.—Additional differentiating characters for *Jaegerinopsis squarrosa* are given and brief comparisons made with other species of the genus.—E. B. Chamberlain.

1415. BRITTON, ELIZABETH G. Porotrichum, not Thamnobryum. Bryologist 21: 83-84. 1918.—The author maintains that the publication of new combinations under the new generic name *Thamnobryum* was needless, as all species may be included in *Porotrichum*.—E. B. Chamberlain.

1416. EMIG, W. H. Octodiceras julianum Brid., var. ohioense, new variety. Bryologist 21: 60-61. Pl. 26. 1918.—A new form of aquatic moss is described from Ohio, figures being given of both species and variety.—E. B. Chamberlain.

1417. FRYE, T. C. The Rhacomitriums of Western North America (concluded). Bryologist 21: 1-16. Pl. 1-14. 1918.—This article is a continuation from November, 1917, issue of same journal. Thirteen species and varieties, of the genus *Rhacomitrium*, occurring north of the Mexican boundary in the western part of North America are described and figured. Ranges, comparative notes, and the principal synonyms are given as well as a tabular key to the various species; in the earlier portion of the article (November issue) a key of the usual form is also given. One new combination is made.—E. B. Chamberlain.

1418. JENNINGS, O. E. Notes on the mosses of northwestern Ontario. I. Sphagnum. Bryologist 21: 69-77. Pl. 27, map. 1918.—This is an annotated list of twelve species of *Sphagnum* collected along the northern shore of Lake Superior and around Lake Nipigon. Detailed lists of the collections are given, and brief summaries of the general continental range of the various species, as well as specific citation of previous Canadian reports. An outline of the general character of the country is also given.—E. B. Chamberlain.

1419. LEVY, DAISY J. A station for *Ephemerum* near New York City. Bryologist 21: 33. 1918.

1420. NICHOLS, GEORGE E. Additions to the list of Bryophytes from Cape Breton. Bryologist 21: 28-29. 1918.—Four hepatics and twelve mosses are listed as additions to the author's previous list of species.—E. B. Chamberlain.

1421. NIEUWLAND, J. A. Critical notes on new and old genera of plants. X. Amer. Midland Nat. 5: 50-52. 1917.—The author changes the generic name *Thamnum* Bry. Eur. to *Thamnobryum* on account of an older *Thamnum* Klotzsch, making eight new combinations. He also publishes *Villania*, with three new combinations, in place of the algal genus name *Zonaria* J. Ag., and *Kulmites*, with one new combination in place of the fossil-plant name *Taenidium* Heer.—E. B. Chamberlain.

1422. SHERRIN, W. R. The Lamellae of *Polytrichum*. Jour. of Bot. 56: 105-107. 1918.—The lamellae on the inner surface of the leaves of *Polytrichum* which furnish valuable diagnostic characters can be scraped off and examined laterally under the microscope without the necessity of section-cutting. Figures and keys illustrate the use of the characters thus obtained for the species found in Great Britain.—A. Le Roy Andrews.

1423. THÉRIOT, I. Note sur une mousse du Chili. Recueil Publ. Soc. Havraise d'études diverses. 1er trimestre, 1917: 1-7. [Repaged reprint, no date of publication.]—*Barbula flagellaris* Schimp. has been misinterpreted by authors. The plants currently called *P. flagellaris* belong to *P. depressa* Sull. while the true form is a *Tortula* (*T. flagellaris* (Schimp.) Ther.) that has also been described as *T. perflaccida* Broth.—E. B. Chamberlain.

1424. THÉRIOT, I. Mousses du Caucase. Bull. Geog. Bot. July-Sept., 1918: 121-137. 1918.—An annotated list of species from two collections made principally in Daghestan and in Adzaria, with new forms in *Dicranella* (2), *Fissidens*, *Mniobryum*, *Bartramia*; and new species in *Homalia* and *Brachythecium* (2).—E. B. Chamberlain.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

[Unsigned abstracts are by the editor.]

1425. ANONYMOUS. *Novitates Africanæ*. Ann. Bolus Herb. 2: 153-162. *Pls.* 10-13. 1918.—Under the above title the following new species are described from South Africa: *Empleurum fragrans* Glover, *E. latiflora*, *E. Ethelæ*, *E. dulcis*, *E. gallorum*, *E. excavata*, *E. Westii*, *E. Symonsii* L. Bolus, *Erica Cameronii*, *E. elimensis*, *E. Varderi*, *E. Dykei*, *E. Pearsoniana*, *E. arenaria* L. Bolus, *Geissorhiza tulbaghensis*, *Tritonia lilacina*, *T. Flanaganii* Bolus f., and *Watsonia albertiniensis* Glover.

1426. FERNALD, M. L. An intergeneric hybrid in the Cyperaceæ. *Rhodora* 20: 189-191. *Pl.* 125. 1918.—Fernald describes and illustrates a new hybrid, \times *Cyperus Weatherbianus* (*Cyperus dentatus* \times *Rhynchospora capitellata*), from Massachusetts.

1427. FORBES, CHARLES N. The genus *Lagenophora* in the Hawaiian Islands. Occasional Papers Bernice Pauhi Bishop Mus. Polynes. Ethn. and Nat. Hist. 6: 55-62 [301-308]. *Pl.* 1-4. 1918.—Three species and one variety are recognized of which *Lagenophora maviensis* Mann forma *emarginata*, *L. Erii* Forbes, and *L. Helena* Forbes & Lydgate are described as new to science.

1428. FREEMAN, GEORGE F. The purple hyacinth bean. *Bot. Gaz.* 66: 512-523. *Fig.* 1-7. 1918.—The author presents a discussion of the plants cultivated under the name of hyacinth bean and concludes that there are two distinct species namely, *Dolichos Lablab* L. and *D. lignosus* L.

1429. JUEL, H. O. Beiträge zur Blütenanatomie und zur Systematik der Rosaceen. K. Sv. Vet. Akad. Handl. 58^o: p. 1-81. *Text fig.* 135. 1918.—The author proposes a rearrangement in the sequence of the genera of the Rosaceæ, based primarily on considerations of the ovule.

1430. MACBRIDE, J. FRANCIS. I. Further new or otherwise interesting *Lilaceæ*. II. A revision of *Mirabilis*, subgenus *Hesperonia*. III. A revision of *Mentzelia*, section *Trachyphytum*. IV. Certain North American *Umbelliferae*. V. Reclassified or new *Compositæ*, chiefly North American *Helenieæ*. VI. Various American *Spermatophytes*, new or transferred. *Contrib. Gray Herb. Harvard Univ.* N. S. 56: 1-61. 1918.—The titles clearly indicate the general character of their contents. The following new combinations with the name-bearing synonym in parenthesis, new names, and new species are included: *Dichopogon fimbriatus* (*Arthropodium fimbriatum* R. Br.), *Arthropodium milleflorum* (*Anthericum milleflorum* Red.), *Trichopetalum plumosum* (*Anthericum plumosum* R. & P.), *Corynotheca micrantha* (*Asparagus micranthus* Lindl.), *Schoenolirion albiflorum* (*Amblostima albiflora* Raf.), *Schizobasopsis* nom. nov., *S. volubilis* (*Bowiea volubilis* Harv.), *Aloe disticha* Mill. var. *brachyphylla* (*A. Saponaria* (Ait.) Haw. var. *brachyphylla* Baker), *Acanthocarpus mucronatus* (*Xerotes mucronata* R. Br.), *Lomandra effusa* (*Xerotes effusa* Lindl.), *L. Endlicheri* (*Xerotes Endlicheri* Muell.), *L. glauca* (*Xerotes glauca* R. Br.), *L. leucocephala* (*Xerotes leucocephala* R. Br.), *L. obliqua* (*Dracaena obliqua* Thumb.), *L. spartea* (*Xerotes spartea* Endl.), *Gagea villosa* (*Anthericum villosum* Labill.), *Allium cernuum* Roth var. *neo-mexicanum* (*A. neo-mexicanum* Rydb.), *A. Rydbergii*, *A. jubatum*, *Bloomeria maritima* (*Hesperoscordium maritimum* Torr.), *B. maritima* (Torr.) Macbr. var. *serotina* (*Muilla serotina* Greene), *B. transmontana* (*Muilla transmontana* Greene), *B. Purpusii* (*Muilla Purpusii* Brandg.), *Brodiaea grandiflora* (*Triteleia grandiflora* Lindl.), *B. capitata* Benth. var. *insularis* (*B. insularis* Greene), *B. coerulea* (*Milla coerulea* Scheele), *B. breviflora* (*Androstephium breviflorum* Wats.), *Bessera tenuiflora* (*Behria tenuiflora* Greene), *Calochortus macrocarpus* Dougl. var. *cyaneus* (*Cyaneus* A. Nels.), *C. macrocarpus* Dougl. var. *maculosus* Nels. & Macbr. (*C. maculosus* Nels. & Macbr.), *Scilla hyacinthina* (*Ledebouria hyacinthina* Roth), *Camassia Walpolei* (*Quamassia Walpolei* Piper), *Hyacinthus atroviolaceus* (*Bellevalia atroviolacea* Regel), *Yucca*

Treleasei, *Nolina juncea* (*Dasyllirion junceum* Zucc.), *Dasyllirion longistylum*, *D. recurvatum* (*Beaucarnea recurvata* Lemaire), *D. strictum* (*Beaucarnea stricta* Lemaire), *D. gracile* (*Beaucarnea gracilis* Lemaire), *Cordylina mauritiana* (*Dracaena mauritiana* Bojer), *Asparagus Krausianum* (*Myrsiphyllum Krausianum* Kunth), *A. asparagoides* (L.) W. F. Wight var. *angustifolius* (*Medeola angustifolia* Mill.), *A. Fysoni*, *Clintonia alpina* (Royle) Kunth var. *udensis* (*C. udensis* Traut. & Mey.), *Smilacina amplexicaulis* Nutt. var. *glabra*, *S. purpurea* Wall. forma *pallida* (*S. pallida* Royle), *Polygonatum odoratum* (Mill.) Druce var. *ambiguum* (*P. ambiguum* Link), *Trillium Underwoodii* Small var. *luteum* (*T. sessile* L. var. *luteum* Muhl.), *Aletris pauciflora* (Klotsch) Franchet var. *hasiana* (*A. hasiana* Hook. f.), *Luzuriaga polyphylla* (*Callixene polyphylla* Hook.), *Mirabilis tenuiloba* Wats. var. *polyphylla* (*Hesperonia polyphylla* Standley), *M. oligantha* (*Hesperonia oligantha* Standley), *M. californica* Gray var. *cedrosensis* (*Hesperonia cedrosensis* Standley), *M. Heimerlii* (*Hesperonia Heimerlii* Standley), *Mentzelia dispersa* Wats. var. *latifolia* (*Acrolasia latifolia* Rydb.), *M. dispersa* Wats. var. *compacta* (*M. compacta* A. Nels.), *M. congesta* T. & G. var. *Davidsoniana* (*Acrolasia Davidsoniana* Abrams), *Tauschia arguta* (*Deweya arguta* T. & G.), *T. Hartwegi* (*Deweya Hartwegi* Gray), *T. Parishii* (*Velaea Parishii* Coult. & Rose), *T. vestita* (*Deweya vestita* Wats.), *T. Howellii* (*Velaea Howellii* Coult. & Rose), *T. fusiformis* (*Museniopsis fusiformis* Rose), *T. biennis* (*Museniopsis biennis* Coult. & Rose), *T. peucedanoides* (*Cnidium peucedanoides* HBK.), *T. drudeophytoides*, *T. pubescens* (*Museniopsis pubescens* Coult. & Rose), *T. scabrella* (*Museniopsis scabrella* Coult. & Rose), *T. guatemalensis* (*Donnellsmithia guatemalensis* Coult. & Rose), *Lomatium simplex* (*Peucedanum simplex* Nutt.), *L. Nuttallii* (*Seseli Nuttallii* Gray), *L. alpinum* (*Peucedanum graveolens* Wats. var. *alpinum* Wats.), *L. Parryi* (*Peucedanum Parryi* Wats.), *L. Eastwoodae* (*Cynomarathrum Eastwoodae* Coult. & Rose), *L. Brandegei* (*Peucedanum Brandegei* Coult. & Rose), *Ericameria Bloomeri* (*Aplopappus Bloomeri* Gray), *E. fasciculata* (*Chrysoma fasciculata* Eastw.), *Aster deserticola*, *Perityle megaloccephala* (*Laphamia megaloccephala* Wats.), *P. Stansburii* (*Laphamia Stansburii* Gray), *P. Toumeyi* (*Laphamia Toumeyi* Rob. & Greenm.), *P. tenella* (*Laphamia tenella* Jones), *P. gilensis* (*Laphamia gilensis* Jones), *P. Lemmoni* (*Laphamia Lemmoni* Gray), *P. trisecta* (*Leptopharynx trisecta* Rydb.), *Bahia integrifolia* (*Schkuhria integrifolia* Gray), *Actinea depressa* (T. & G.) Ktze. var. *pygmaea* (*Actinella depressa* T. & G. var. *pygmaea* Gray), *A. acaulis* (Pursh) Spreng. var. *lanata* (*Actinella lanata* Nutt.), *A. acaulis* (Pursh) Spreng. var. *lanata* forma *caespitosa* (*Tetranneuris acaulis* var. *caespitosa* A. Nels.), *A. acaulis* (Pursh) Spreng. var. *lanata* (Nutt.) Macbr. forma *arizonica* (*Tetranneuris arizonica* Greene), *A. acaulis* (Pursh) Spreng. var. *simplex* (*Tetranneuris simplex* A. Nels.), *A. Torrejana* (*Actinella Torrejana* Nutt.), *A. leptoclada* (Gray) Ktze. var. *Ivesiana* (*Tetranneuris Ivesiana* Greene), *Helenium tinctorium* (*Santolina tinctoria* Mol.), *H. plantagineum* (*Cephalophora plantaginea* DC.), *H. Leguiffei* (*Cephalophora Leguiffei* Phil.), *Monolopia major* DC. var. *gracilens* (*M. gracilens* Gray), *Dyssodia Palmeri* (*Urbinella Palmeri* Greenm.), *Matricaria suffruticosa* (*Tanacetum suffruticosum* L.), *Cirsium californicum* Gray var. *bernardinum* (*Carduus bernardinus* Greene), *Suaeda nigra* (*Chenopodium nigrum* Raf.), *Guatteria boyacana*, *Duguetia vallicola*, *Krameria parvifolia* Benth. var. *glandulosa* (*K. glandulosa* Rose & Painter), *K. parvifolia* Benth. var. *imparata*, *Draba Paysonii*, *Machaerium Whitfordii*, *Clarkia Dudleyana* (*Godetia Dudleyana* Abrams), *Cornus californica* C. A. Mey. var. *pubescens* (*C. pubescens* Nutt.), *Rhododendron Warrenii* (*Azaleastrum Warrenii* A. Nels.), *Gilia debilis* Wats. var. *Larseni* (*G. Larseni* Gray), *G. Rawsoniana* (*Collomia Rawsoniana* Greene), *G. effusa* (*Loeselia effusa* Gray), *G. grandiflora* (Dougl.) Gray var. *axillaris* (*Collomia grandiflora* var. *axillaris* A. Nels.), *G. biflora* (*Phlox biflora* Ruiz. & Pav.), *Cryptantha echinosepala*, *C. quentinensis*, *C. barbigera* (Gray) Greene var. *Fergusonae*, *C. intermedia* (Gray) Greene var. *Johnstonii*, *Pedicularis canadensis* L. var. *fluvialis* (*P. fluvialis* Heller), *P. crenulata* Benth. forma *candida*, and *Plantago Parishii*.

1431. MERRILL, E. D. *Oreomyrrhis borneensis* Merr. sp. nov., an interesting addition to our knowledge of the Malayan flora. *Amer. Jour. Bot.* 5: 514-515. Pl. 36. 1918.—The author describes and illustrates a new species of *Oreomyrrhis* from specimens collected on Mount Kinabalu, British North Borneo. This species is regarded as an outlying representative of the New Zealand-Australian flora.

1432. MERRILL, E. D. New or noteworthy Philippine Plants, XIV. Philippine Jour. Sci. Bot. 13: 263-333. 1918.—The present paper, like the preceding ones of this series, is devoted primarily to the description of new species of which there are 84, distributed in 26 families; these are as follows: *Pandanus subacaulis*, *P. philippinensis*, *P. occultus*, *P. akladus*, *P. biliranensis*, *Freycinetia acutifolia*, *F. platyphylla*, *F. botuliformis*, *F. bulusanensis*, *F. apayaoensis*, *Phacelophrynium cylindricum*, *Laportea pendula*, *Elatostema catanduanense*, *Quercus rizalensis*, *Loranthus confertiflorus*, *L. crassilimbus*, *L. Edanoi*, *L. samarensis*, *L. pachycladus*, *L. amplifolius*, *L. ovatibracteus*, *L. Spraguei* (*L. pubiflorus* Merr., not Sprague), *L. palawanensis* (*L. fragilis* Merr., not Sprague), *Elytranthe Acuña*, *Aristolochia soveolata*, *Myristica mindorensis*, *M. discolor*, *M. nitida*, *M. palawanensis*, *Gymnacranthera macrobotrys*, *Horsfieldia confertiflora*, *H. megacarpa*, *H. oblongata*, *Knema parvifolia*, *K. Alvarezii*, *Aglaia rizalensis*, *A. pyriformis*, *A. puncticulata*, *A. Robinsonii*, *A. tayabensis*, *A. grandifoliola*, *A. lancilimba*, *A. Mirandae*, *A. myriantha*, *A. pallens* (*A. elaeagnoidea* var. *pallens* Merr.), *Chisocheton parvifoliolus*, *Dysoxylum hexandrum*, *D. ilocanum*, *D. panayense*, *Vavaea retusa*, *V. pilosa*, *V. heterophylla*, *V. pachyphylla*, *Canarium microphyllum*, *Santiria elliptifolia*, *Microtropis philippinensis*, *Leea papillosa*, *Saurauia oligophlebia*, *Ternstroemia megacarpa*, *Eurya pachyphylla*, *E. pachyrhachis*, *Vatica pachyphylla*, *Wikstroemia Fenicis*, *W. brachyantha*, *Begonia Edanoi*, *Memecylon elliptifolium*, *Everettia octodonta*, *Acanthophora scandens* (a new genus and species of the Araliaceae), *Boerlagiodendron catanduanense*, *Schefflera catanduanensis*, *S. elliptifoliola*, *S. myrianthella*, *Maesa brunnea*, *Diospyros streptosepala*, *Bassia oblongifolia*, *B. Mirandae*, *Linociera remotinervia*, *Mastixia pachyphylla*, *Cyrtandra Alvarezii*, *C. castanea*, *C. multifolia*, *C. microphylla*, *C. longipes*, *C. tenupies* (*C. longipedunculata* Merr., not Reehinger), *Dischidia lancifolia*, *Hoya pentaphlebia*, *H. pubicalyx*, and *Trichosanthes ellipsoidea*.

1433. ROCK, JOSEPH F. *Cyrtandreae Hawaiienses*, Sect. *Crotonocalyces* Hillebr. Amer. Jour. Bot. 4: 259-277. Pl. 18-23. 1918.—The author has revised the *Cyrtandreae* of Hawaii, as this group was defined by Hillebrand. Thirteen species, 11 varieties, and 1 form are recognized of which the following are either new or new combinations: *Cyrtandra Knudsenii*, *C. malacophylla* Clarke var. *erosa*, *C. cordifolia* Gaud. var. *gynoglabra*, *C. crassifolia* (*C. Pickeringii* β var. *crassifolia* Hillebr.), *C. mauensis*, *C. mauensis* var. *truncata*, *C. tintinnabula*, *C. platyphylla* Gray typica, *C. platyphylla* var. *stylopubens*, *C. platyphylla* var. *stylopubens* forma ovata, *C. platyphylla* var. *parvilora*, *C. platyphylla* var. *membranacea*, *C. platyphylla* var. *hiloensis*, *C. platyphylla* var. *robusta*, *C. caulescens*, *C. Pickeringii* Gray var. *waiheae*, *C. Pickeringii* var. *honolulensis* (*C. honolulensis* Wawra).

1434. RYDBERG, PER AXEL. Rosaceae (Conclusio). North Amer. Flora 22^o: 481-533. Dec. 30, 1918.—The present part concludes the author's treatment of the rose family and includes 3 tribes namely, *Kerrieae* with 2 genera, *Kerria* and *Neviusia* each with one species, *Osmaronieae* also with one species, *Osmaronia cerasiformis* (T. & G.) Greene, and *Roseae* with one genus in which 129 species are recognized. The following species are published as new to science: *Rosa nanella*, *R. obtusiuscula*, *R. subserrulata*, *R. Bicknellii*, *R. petiolata*, *R. Aucuparia*, *R. Palmeri*, *R. Treleasei*, *R. texarkana*, *R. subglauca*, *R. conjuncta*, *R. Bushii*, *R. Butleri*, *R. subblanda*, *R. columbiana*, *R. palustriformis*, *R. arizonica*, *R. granulifera*, *R. bidenticulata*, *R. corymbiflora*, *R. Johnstonii*, *R. Eastwoodiae*, *R. Standleyi*, and *R. oligocarpa*. Several hybrid roses are described. This part, pp. 535-560, also contains "Additions and Corrections" to the families Podostemonaceae by G. V. Nash, Crassulaceae by J. N. Rose, Penthoraceae and Parnassiaceae by P. A. Rydberg, Saxifragaceae and Hydrangeaceae by J. K. Small and P. A. Rydberg, Cunoniaceae, Iteaceae, Hamamelidaceae, and Connaraceae by N. L. Britton, Escalloniaceae by J. K. Small, Altingiaceae by P. Wilson, Grossulariaceae by F. V. Coville and N. L. Britton, and Platanaceae by H. A. Gleason. The following new combinations and new species are included: *Micranthes gaspensis* Small (*Saxifraga gaspensis* Fernald), *M. interrupta* Small, *Neodeutzia occidentalis* Rydb. (*Deutzia occidentalis* Standley), and *Connarus Williamsii* Britton.

1435. SCHNEIDER, CAMILLO. A conspectus of Mexican, West Indian, Central and South American species and varieties of *Salix*. Bot. Gaz. 65: 1-14. 1918.—The present conspectus is concerned primarily with forms of the *Pleiandrae* group. About twenty species and thirteen varieties are included of which three species and eleven varieties are either described as new to science or result from a recombination of names.

1436. STANDLEY, PAUL C. *Blepharidium*, a new genus of Rubiaceae from Guatemala. Jour. Washington Acad. Sci. 8: 58-60. 1918.—*Blepharidium guatemalense* Standley is published as the type of a new genus of the tribe *Cinchoneae*. The genus is based on specimens collected by Henry Pittier in the department of Alta Verapaz, Guatemala.

1437. STANDLEY, PAUL C. A new species of *Rondeletia* from Mexico. Jour. Washington Acad. Sci. 8: 126-127. 1918.—*Rnodeletia Reko* Standley is described as a new species from the state of Oaxaca.

1438. STANDLEY, PAUL C. *Omiltemia*, a new genus of Rubiaceae from Mexico. Jour. Washington Acad. Sci. 8: 426-427. 1918.—*Omiltemia longipes* Standley is proposed as the type of a new genus of the Rubiceae. The original diagnosis is drawn from specimens collected by E. W. Nelson in the state of Guerrero.

1439. VAN ESELTINE, G. P. The allies of *Selaginella rupestris* in the southeastern United States. Contrib. U. S. Nation. Herb. 20: 159-172. Pl. 15-22, text fig. 8. 1918.—Descriptions with a key, of *S. rupestris* and 7 allied species endemic to the southeastern states. Two new species, *S. Riddellii* of central and eastern Texas and probably southern Louisiana, and *S. humifusa* of central and southern Florida, are included in this consideration, which is one of a series concerning the *Selaginella rupestris* group.—Norma E. Pfeiffer.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for all of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although some of them are shown on cover page 1 of the present issue.

On request the section for Cytology has been restored. Professor Gilbert M. Smith, Madison, Wisconsin, has been made editor for the section. Collaborators will receive full instructions from the Bibliographical Committee concerning the preparation of abstracts for the new section. It will appear in volume 3.

A list of collaborators of Botanical Abstracts will appear from time to time.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

An author's index and an index to sections, together with a list of names of abstractors and of serials cited in volume 1 will accompany volume 2, No. 1. No subject index will be supplied until the end of volume 2, there being a single index for the two volumes.

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The Johns Hopkins University, Baltimore, Maryland

Vol. I

FEBRUARY, 1919

No. 6

ENTRIES 1440-1681

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

1440. BAKER, FREDERICK S. Native plants as indicators of forest planting sites. Jour. Ecol. 6: 96. Mar. 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—The native vegetation on a given site indicates the chief factors governing the value of that site for forest planting, based on the nature of its root systems, the transpirational activity, and its place in the natural succession. However, the indicator plants react upon the site and must also be taken into consideration in determining its potentiality.—*Frederick S. Baker.*

1441. EMIG, W. H. The plant geography of the Arbuckle Mountains, Oklahoma. Jour. Ecol. 6: 95. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—In these studies the plants were grown in glass tubes and were under constant conditions of temperature and illumination. A prepared gaseous mixture containing oxygen in concentration varying between about 0.7 per cent and 14.4 per cent was employed. The root growth of *Prosopis velutina* and *Opuntia versicolor* as well as that of certain other species, in soil with unlike oxygen content, was observed. The results previously obtained, namely, that the roots of *Opuntia* appear to require a better aerated soil for growth than do those of *Prosopis*, were verified. Growth of the roots of cuttings of *Opuntia* and of relatively long *Prosopis* roots ceases promptly in an atmosphere containing less than 1 per cent oxygen, but if there is 10 per cent more or less oxygen in the air of the soil, root growth continues for several hours at a diminishing rate, and at length ceases. The rate of root growth at parallel soil temperatures and in an atmosphere of the same oxygen content is always greater in *Prosopis* than in *Opuntia*. The relation of root growth of relatively young *Prosopis* plants to oxygen appears to be inconsistent, although exactly on what this is based was not learned. A certain, but relatively slow growth rate occurs in the roots of very young *Prosopis* in an atmosphere containing less than 1 per cent oxygen. Under the same conditions the roots of *Covillea tridentata* of the same age either exhibit no growth or very little growth. Thus it is shown that the roots of young and relatively young desert plants show unlike relations to oxygen.—*W. H. Emig.*

1442. HEMSLEY, W. B. The palms of Seychelles and the Mascarenes. Nature 101: 73-74. Mar., 1918.—Data obtained largely through communications from P. R. Dupont, for many years curator of the Botanical Station at Mahé in the Seychelles. Palms constitute the most

striking feature of the Seychelles vegetation, and they conspicuously overtop most of the other trees. Endemism in palms reaches its culmination in these islands, some species being confined to a single island; even the genera are much restricted, hardly any of them being found outside these archipelagoes. Interesting notes are given concerning *Lodoicea*, the best known of the Seychelles palms.

1443. JEFFREYS, HAROLD. Ecology as a subject for teaching. *New Phytol.* 17: 51-53. 1918.—See Bot. Absts. 1, Entry 463.

1444. KORSTIAN, CLARENCE F., AND FREDERICK S. BAKER. Precipitation as a factor limiting the distribution of *Pinus ponderosa scopulorum*. *Jour. Ecol.*, 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—After compiling data from a number of cooperative Weather Bureau stations within the range of the Rocky Mountain variety of western yellow pine (*Pinus ponderosa scopulorum*) it is concluded that the amount of precipitation during the summer is a potent factor in limiting its distribution, especially in determining its lower limits and in limiting its occurrence in the Great Basin to small isolated areas and scattered individuals. Annual precipitation curves for stations within the range of the variety show a decided crest occurring during June, July or August, while such a crest is practically lacking for Great Basin stations which otherwise appear comparable.—C. F. Korstian and F. S. Baker.

1445. MEDSGER, OLIVER P. Two months in the southern Catskills. [New York] *Mém. Torr. Bot. Club.* 17: 294-300. June, 1918.—A brief account of collections and notes on the vegetation of Slide Mountain, Ulster County, N. Y., and neighboring mountains. Of interest chiefly because this mountain is the highest in the region within 100 miles of New York, and there are noted some altitudinal records for the occurrence of certain species of flowering plants, and types of vegetation from 1000 to 4250 feet, the latter being the summit altitude of Slide Mountain. Among the plants noted are *Picea rubra* in a virgin forest, *Sorbus americana* showing much leaf variation, numerous ferns including *Onoclea Struthiopteris*, *Campytosorus Braunii*, *Aspidium Goldianum* and *Botrychium lanceolatum*, and many typical northern species such as *Acer pennsylvanicum*, *Clintonia borealis*, and *Chiogenes hispidula*.—Norman Taylor and Geo. D. Fuller.

1446. PEARSALL, W. H. On the classification of aquatic plant communities. *Jour. Ecol.* 6: 75-83. Mar., 1918.—The writer reviews the attempts at classification of aquatic plant communities on the basis of (1) growth form, (2) habit and (3) succession, and expresses his agreement with the last. The development of the succession in aquatic habits is controlled principally by the rate of sedimentation. It is further emphasized that there is no fundamental distinction between aquatic and fen stages, the top number of the aquatic stages being the pioneer community in the fen series. The application of the terminology of Clement's "Plant Succession" to such communities is also discussed and found to be in harmony with Pearsall's ideas, and applicable to the examples cited from English lakes. The principal habitat factors are shown to be: (1) Large variations in the dissolved mineral and organic contents of the water; (2) Variations in the amount and type of sediments deposited and; (3) The physical and chemical nature of the primitive lake floor.

It is concluded that aquatic plants bear no markedly dissimilar relation to the substratum than do plants of terrestrial habit and this is taken as justifying the inclusion of aquatic and terrestrial communities in one unbroken succession. The proposed system of classification therefore makes succession the fundamental idea with growth forms and habitat as factors of importance in considering the distribution of communities and in determining their status.—Geo. D. Fuller.

1447. PEARSALL, W. H. The aquatic and marsh vegetation of Esthwaite Water. *Jour. Ecol.* 5: 180-202. 1917. *Ibid.* 6: 53-74. Fig. 12. Mar., 1918.—This is a detailed study of the vegetation of a narrow lake situated in the Lake District of England. Quantitative data

are presented of depth, composition of water, character of deposits and light intensities at various depths and these data are made graphic in maps and curves. The composition, distribution and succession of the various aquatic communities up to the reed swamp are carefully studied and mapped. The terrestrial hydrophytic vegetation is placed in two subdivisions, the marsh with zonal plant communities bearing no relation to the aquatic succession and the fen composed of communities succeeding aquatic plants as the mud gets above water level. The former contains a variety of swamp associations of the usual type including herbaceous and forest communities, while in the latter three series are distinguished depending upon the rate of sedimentation. All are supposed to begin with the reed swamp and all include associations of various grasses and sedges, while the area of moderate sedimentation has in addition associations known as "carrs," in which shrubs mingle with the herbaceous species of the fen. The "open carr" trees and shrubs form thickets in the fen, *Salix cinerea*, *S. purpurea*, *Alnus glutinosa* and *Betula tomentosa* being most abundant. The same species form the succeeding "closed carr" and with *Alnus rotundifolia*, *Rhamnus frangula* and *Myrica Gale* constitute a dense swamp forest. Emphasis is placed upon the variations in succession due to different rates of sedimentation and interesting observations presented upon the relation of fens to moors.—Geo. D. Fuller.

1448. WATSON, W. Cryptogamic vegetation of the sand dunes of the west coast of England. Jour. Ecol. 6: 126-143. 3 fig. June, 1918.—The dunes studied are those of the Devon and Somerset shore and it is shown that their most abundant plants are often mosses or lichens. Such species as *Tortula ruraliformis*, *Camptothecium lutescens*, *Brachythecium albicans*, *Cladonia furcata*, *Peltigera canina* and *P. rufescens* being characteristic of unstable dunes. In brackish hollows associations of *Riccia crystallina* occur, wet hollows are often occupied by *Harpidia* (*Hypnum*) association and moist depressions by a *Brya* (*Bryum*) association. Other less important communities occur in various situations. Of all these complete lists of species are given and it is noted that while many of the bryophytes on the dunes have xerophytic characters none can be called xerophytes.—Geo. D. Fuller.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, Editor

[Unsigned abstracts are by the editor.]

1449. ANDREWS, E. F. Agency of fire in propagation of longleaf pines. Bot. Gaz. 64: 497-508. Dec., 1917.—Relates the history of two groups of longleaf pine (*Pinus palustris*), which he observed at the upper and northern limits of the species on Lavender Mountain, Georgia, as evidence of the agency of fire in the propagation of this species. One group was burned over in 1915, while the other had not suffered from fire at any time as far as could be seen. Both "plots" were strictly comparable as to soil, and were located on opposite sides of a ravine. In 1913, when the first observations were made both were evenly covered with a dense growth consisting of *Pteris aquilina*, *Tephrosia virginica* together with species of *Andropogon* and sedges. A part of the area that was later burned over had been cleared at one time but on account of the steepness of the slope had been allowed to revert again to native brush and weeds. In 1913 there were five pines visible on this area and four on the other "control." In 1915 soon after a fire 34 longleaf pines were found in the burned area which had been generally invisible before on account of the dense growth of weeds. The fire had swept away all the competing vegetation and left the area to the pines, whose leaves, though scorched and burned off, had sufficiently protected the growing tip to preserve the life of the trees. In the unburned area there were still 4 trees. In 1917, on the area that had been burned there were 66 trees, while on the other only 2 were left.

The evidence of the resistance of the pine seedlings to fire seems somewhat surprising at first, but it is confirmed by several rough experiments on the behavior of the seedlings in ground fires. These showed that the leaves were not at all inflammable and that they are so

arranged as to shield the growing point. To all appearances exposures as long as 8.5 minutes to a brisk fire of chips were not sufficient to cause death to seedlings a few years old.

In general, foresters have a tendency to condemn fires absolutely and such evidence as this deserves careful consideration. It must be noted however that two very important points have been omitted from the discussion. The first is that the reproduction was much the more vigorous in the first place on the burned plot because of the abandoned clearing where the pines found a congenial seed bed years before the fire (rather than any greater seeding toward the open as intimated in the article as the cause of the heavy reproduction there), and second, the resistance of the cambium to fire after the lower needles have dried or fallen was not investigated. Taking it as a whole, the kernel of the matter is found in the last sentence, the italics are the reviewers, ". . . when forest fires, especially of the minor type known as 'ground fires' and 'brush fires,' occur at not too frequent intervals, the immunity of the pines enables them to take the lead in the work of reforestation, and through the gradual elimination of their rivals to become finally the sole possessors of the soil."—*F. S. Baker.*

1450. BLACKMAN, V. H., AND R. C. KNIGHT. A method of controlling the rate of air movement in transpiration experiments. *Ann. Bot.* 31: 122, 218. Apr., 1917.—This article deals with a device to produce uniform air currents by means of a fan and a horizontal flue for use in experiments on the rate of transpiration. The usual methods of investigation in still air have not proved satisfactory on account of the difficulty in showing that the air is really still by periodic observations of the speed of air in the vicinity of the plant. The elimination of air currents and other external factors in these experiments by considering relative transpiration rather than absolute transpiration, i.e., the ratio between transpiration by the plant and evaporation from an atmometer, is not altogether satisfactory since the response of the plant and that of the atmometer to air currents are not proportional.

The device described is as follows:—To obtain the steady movement of air which was desired, a special 'air-flue' was constructed, by which the plant could be protected from chance air currents, and at the same time subjected to a current of constant velocity, the velocity being variable at will. The apparatus consisted of a wooden box 2.25 metres long and 60 cm. in height and breadth. In one end, A, is a circular aperture to accommodate the revolving blades of a fan. The other end, B, of the flue is open, and the four walls are extended by means of bent metal sheets to form a bell mouth, so as to reduce to a minimum the formation of eddy currents at the edges of the opening and the consequent irregularities in the air movement through the flue. Near the center of the flue a section of the roof and sides is replaced by sheets of plate-glass; it is in this section, which is 60 cm. long, that the plants under observation are placed. The glass sheet at the top is divided in two, parallel to the long axis of the flue, and the two parts slide in and out. The front sheet also slides up to facilitate the manipulation of the apparatus or plant inside. This sheet is provided with a small, sliding door, 18 cm. square, which is convenient for minor operations not requiring the removal of the whole sheet. The woodwork is painted white so that the light may not be unduly reduced. Air is drawn through the flue by an electrically driven fan working in the aperture. Several fans and motors have been tried, but during long-period experiments it was found that the ordinary fan motor is not sufficiently constant in speed but tends to slow down slightly. The most satisfactory motor was found to be one with a governing mechanism. With this arrangement slow air currents, as low as 5 metres per minute, which have been mostly used, are easily obtainable.—The speed of the air current is estimated by means of an anemometer except in the case of very low speeds, when the rate of movement of smoke through the flue is timed by a stopwatch.—Air movement was tested by atmometer readings under constant conditions of temperature and humidity, and the results of an experiment carried out in a dark room show great regularity and small variation in half-hour periods.—The apparatus has been used and found satisfactory for air movements up to a speed of 25 metres per minute, although the higher speeds are generally not convenient for transpiration experiments. It is stated that by tests of atmometers it has been found desirable to use as high a speed as possible since greater regularity is obtained in this way.—*E. R. Hodson.*

1451. BUTTERWICK, A. J. Manufacture of matches in Rangoon. *Indian Forester* 44: 410-17. Sept. 1918.—Of thirteen species tried for matches only Letpon (*Bombax malabaricum*) and Shuwbyu (*Sterculia foetida*) were found suitable. A description is given of the methods of manufacture.—*Edw. N. Munns.*

1452. GRIFFIN, ALFRED A. Influence of forests upon the melting of snow in the Cascade Range. *Monthly Weather Rev.* 46: 324-327. July 1918.—A study was made in 1916 and 1917 of snow melting in the open and in the forest of three areas on the Columbia River at elevations of around 2000 feet, 3000 feet, and 6500 feet. The water value of the snow cover retained by the forest areas amounted to a mean of 7.5 inches lasting on the average 17 days, at some forested stations for more than 42 days. Drifting occurred only on the higher ridges and chiefly in the open though the late snow banks in the forest resembled drifts. Because of the retention of snow on the crowns of trees and the resulting increased evaporation, snow cover reached a greater depth in the open than in the forest. Under dense forest conditions, the depth of snow retained was greater than in the open forest, at least during the latter part of the melting season. The snow remaining in the forested areas at the time the open stations became bare, was equal to 7.5 inches of water, or 30 per cent. of the maximum snow cover. With the forest areas at higher altitudes and with stations located so as to prevent completely the influence of open areas on the forested stations, and vice versa, the effect was found to be noticeably greater than this. The snow retained in the forest after the open ground was bare was the equivalent of 400 acre-feet of water per square mile, sufficient to supply 150 acres of irrigable agricultural land for the entire season. The effect of the forest cover is to spread this 400 acre-feet of retained snow water through a period of 17 days, important in reducing the crest of the flood and in increasing the minimum flow during low water periods. No records of stream flow from these areas were made.

An unusual factor in delaying melting in the Douglas fir type of forest is the protection given by the irregular layer of even very slight bits of moss, twigs, bark and other litter weathered from the trees. These fragments, which in the open would materially hasten melting by absorbing solar heat, in the forest serve as an effective insulation from the warm air currents above the snow. In the more open forest this effect is less prominent.—*Edw. N. Munns.*

1453. HOFMANN, J. V. Natural regeneration of conifers in the Pacific Coast forests of the United States. *Jour. Agric. Res.* 11: 1-26. Oct. 1917. [Abstract by Nature in *Indian Forester* 44: 234-5. May 1918].—Reproduction in the Pacific Coast conifers after a fire depends more upon the seed stored in the surface soil and unburned litter than upon seed from the nearest forested area. Succession is the replacement of the forest almost immediately by the same species as in the original stand and usually in the same proportion. A comment by the editor of *Indian Forester* brings out that this is known to be the case in Indian forests. Severe fires in hardwoods, consisting of oaks, chestnuts, magnolias, and other species, are followed by the replacement of an almost pure forest of *Magnolia campbellii*.—*Edw. N. Munns.*

1454. NARASIMHAN M. J. A preliminary study of root-nodules of *Casuarina*. *Indian Forester*, 44: 265-268. June, 1918.—*Casuarina* has been successfully cultivated in southern India on many of the wild waste lands. It thrives well on poor, sandy soils, in many places growing luxuriously and aiding greatly in preventing the spreading of dunes. So successful has this been that sandalwood trees can now be grown and cultivated on these dunes. Root nodules were found on the *Casuarina glauca*, *C. Stricta* and *C. quadrivalvis*, many of them large and rather branchy; though soft at first they later became rather woody. Free culture of bacteria from these nodules was made and they were found to fix atmospheric nitrogen. An estimation of the liquid media 35 days after the culture was made showed an increase of 2.7 mg. of nitrogen per 100 cc. of the liquid. It appears that, apart from the usefulness of *Casuarina* trees in binding loose, sandy soils, the trees exert a very beneficial influence by improving the soil to such an extent that facilities are afforded for the succession of the inland flora.—*Edw. N. Munns.*

1455. ROGERS, C. G. **Big teak in Burma.** *Indian Forester*, 44: 417-19. Sept., 1918.—Records are given of some of the big teak trees in Burma; one tree having a circumference of 13 ft. 6 in. contained 861.9 cu. ft. of timber.—*Edw. N. Munns.*

1456. SCHLICH, SIR WILLIAM. **The forests of New Zealand.** *Canadian For. Jour.* 13: 1834. Aug. 1918.—A short account of the timber area and ownership in New Zealand is given, with the amount and value of the exports and imports of 1913. A considerable acreage has been planted to exotics.—*E. N. Munns.*

1457. SPARHAWK, W. N. **Effect of grazing upon western yellow pine reproduction in central Idaho.** *U. S. Dept. Agric. Bull.* 738. 31 p., 4 pl. Dec., 1918.—A study was made of the effect of sheep grazing on a number of sample plots on three grazing allotments between 1912 and 1914. Sheep injure forest reproduction by browsing and by trampling. Slight browsing of the needles, of side branches, of the leader or of the bark does practically no damage to the tree, though when repeated it may result in stunted growth or the death of the tree. Severe browsing, as occurs around bed grounds, often kills the seedlings. Trampling usually is not serious. Damage to seedlings more than a year old was negligible, while as high as 100 per cent—an average of about 20 per cent for all plots—were killed when less than one year old. Western yellow pine (*Pinus ponderosa*) was injured the most by browsing, lodgepole pine (*P. contorta*) less so, and Douglas fir (*Pseudotsuga taxifolia*) least. White fir (*Abies concolor*) is practically never browsed. Of 1,782 seedlings killed, 73 per cent were less than a year old, and but 5 per cent were over 6 inches in height.—Injuries which did not result in death were greater late in the season than during the earlier period, due to drying of the forage as the season advanced. Those killed by grazing were greater earlier in the season than later, as the stem breaks more readily when succulent than after lignification has set in. Injury and death increased fairly constantly with increased intensity of grazing, though after a seedling's third year less than 1 per cent per year of the trees is killed by grazing of moderate intensity. More than three times as many seedlings are killed by other causes than by sheep. Drowth, winter-killing, rodents and birds, and fungus diseases, were the chief causes of death, while frost, rodents and birds are responsible for minor injuries. The benefits of sheep grazing to the forest are through the reduction of fire by the destruction of the inflammable material and the aid to natural forest reproduction, which is often overestimated. A number of suggestions for handling sheep grazing in this type of forest include the time to graze, the intensity of grazing permitted, and methods of handling stock. The latter includes herding, the laying out of driveways, salting, watering and bedding.—*Edw. N. Munns.*

1458. TAYLOR, NATHANIEL R. **Rivers and floods of the Sacramento and San Joaquin watersheds.** *U. S. Dept. Agric., Weather Bur. Bull.* 43. 92 p., *illust., maps, diagrams.* June, 1918.—A discussion of the floods in the principal California watersheds from the earliest known up to the present, with gage heights and hydrographs for the main river tributaries. The increasing flood plane is due to increased height and strength of levees along the stream banks and to the increased and constant enlargement of reclamation areas. Erosion and debris from mining have built up the river beds and the streams are no longer as navigable as formerly.—*Edw. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

1459. ADAMETZ, L. [Hereditary transmission of the "curly wool" character of Caracul sheep in crosses between the Caracul and Rambouillet breeds.] *Zeitschr. induct. Abstamm. Vererb.* 17: 161-202. 1917.—*Abst. in Exp. Sta. Rec.* 38: 575. June 14, 1918.

1460. ANONYMOUS. Citrus hybridization. Jour. Heredity 9: 281. Oct., 1918.—Extensive and comprehensive hybridization of various varieties and species of citrus fruits was begun at Riverside, California in the spring of 1914.—C. E. Myers.

1461. ANONYMOUS. Wanted photographs of twins. Jour. Heredity 9: 262. Oct., 1918.

1462. BABCOCK, E. B. Selecting corn seed. California Agric. Exp. Sta. Circ. 180. 7 p., 3 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 434. April, 1918.

1463. BALL, E. D., AND B. ALDER. Breeding for egg production. II. Seasonal distribution of egg production. Utah Agric. Exp. Sta. Bull. 149. 71 p., 29 fig. 1917.—Abst. in Exp. Sta. Rec. 37: 869-871. Feb. 28, 1918.

1464. BARRUS, MORTIER F. Varietal susceptibility of beans to strains of *Colletotrichum Lindemuthianum* (Sacc. & Magn.) B. & C. Phytopath. 8: 589-614. 5 pl. Dec., 1918.—Between three and four hundred varieties of beans and related plants belonging to ten species of *Phaseolus*, to two species each of *Vigna* and *Dolichos* and to one species each of *Canavali*, *Vicia*, *Cyamopsis*, *Cicer*, *Pisum* and *Lathyrus*, were experimentally studied over period of eight years with regard to resistance and susceptibility to bean anthracnose, *Colletotrichum Lindemuthianum* (Sacc. & Magn.) B. & C. Anthracnose material for inoculation cultures was obtained from several distinct geographical sources, viz., Germany, Illinois, Louisiana, New York, etc. Reactions with the various hosts inoculated demonstrated practicability of recognizing all these geographically distinct cultures as belonging to two strains, morphologically and culturally indistinguishable. These were designated *alpha* and *beta*.—Six degrees of susceptibility of host to parasite were recognized, but this classification was more or less arbitrary and the classes not especially clear cut. From inoculation data on both field and greenhouse plantings, five groups of hosts were recognized: *ab*, varieties susceptible to both anthracnose strains; *aB*, varieties susceptible to strain *alpha* only; *Ab*, varieties susceptible to strain *beta* only; *AB*, varieties showing some resistance (quite marked in some cases) to both *alpha* and *beta* strains; *Miscellaneous*, varieties showing irregularities in susceptibility to both strains.—All attempts to break down host resistance and increase susceptibility by means of heavy fertilization with sodium nitrate, by heavy continued watering, by shading, by drought, and by mechanical injuries to host just before inoculation were unsuccessful, though fully checked by untreated plants. Varieties of beans most resistant to both strains are Wells' Red Kidney, White Marrow and White Imperial, and these are recommended as foundation stocks for producing other desirable resistant commercial varieties. Extensive infection with both strains was secured on teparies (*P. acutifolius* var. *latifolius* G. F.) and black-eyed beans (*Vigna sinensis* (L.) Endl., slight to fair infection on numerous varieties of Lima beans (*P. lunatus*), and slight to no infection on varieties of *Pisum*, *Dolichos*, *P. aureus* Roxb., *P. multiflorus* Willd., *P. aconitifolius* Jacq., *Cyamopsis*, *Canavali*, and sweet peas.—Full descriptions are given of methods, sources of host and parasite material and tables of host varieties tested with their degree of resistance or susceptibility to both strains of anthracnose.—O. E. White.

1465. BERGSTRÖM, SVERKER. Sur les moments de la fonction de correlation normale de n variables. [On the moments of the function of normal correlation of n variables.] Biometrika 12: 177-183. Nov., 1918.—See Bot. Absts. 2, Entry 22.

1466. BLARINGHEM, L. Les complexes végétaux et leurs disjonctions par la vieillesse. [Vegetable complexes and their resolution as a result of aging.] Ann. inst. Pasteur 32: 60-70. 1918.—Exposition of view that "disjonction" is brought about by physical-chemical conditions incident to age. Applied to bud sports of such chimeras as *Cytisus Adami*, to vegetative segregations of parental characters in known hybrids, to cases of degeneration of plants propagated vegetatively (potato, pear, grape, etc.) and to maturity of such parasitic fungi as smuts and rusts.—Changes in environmental conditions are credited with much influence in

inducing "disjunctions." Reports that a well known flour wheat of Russia changes to durum wheat when grown in Algeria and to still different species (*T. turgidum*) when grown in France, the "disjunction" being induced by differences in soil, heat and humidity which especially influence transpiration.—Maintains that hybrids are frequently mosaics of tissues characteristic of the parents, such condition being reported for hybrid *Triticum monococcum* \times *T. durum*. [See Bot. Absts. 1, Entry 1173.]-A. B. Stout.

1467. BRANFORD, R. Some breeding statistics. Agric. Jour. India 12: 573-578. 1917.—Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.

1468. BROILI, J. Die Anwendung des Fruchtgürtels bei der Kartoffel. [The use of the fruit-girdle in potatoes.] Zeitschr. Pflanzenzüchtung 6: 57-60. Mar., 1918.—Describes partially successful attempt to increase berry-production in potatoes, by wrapping stem tightly to check descent of food materials.

1469. COBB, FRIEDA, AND H. H. BARTLETT. Purple bud sport on pale-flowered lilac (*Syringa persica*). Bot. Gaz. 65: 560-562. 1 fig. 1918.—Abst. in Exp. Sta. Rec. 39: 244. 1918. [See Bot. Absts. 1, Entry 216.]

1470. COLLINS, E. J. Potato breeding. Gard. Chron. 64: 226. Dec. 7, 1918.—Lists numerous varieties that are practically synonymous or at least indistinguishable and suggests that pedigree of each new variety be fully and accurately disclosed.—Richard Wellington.

1471. COULTER, JOHN M., AND MERLE C. COULTER. Plant genetics. 19 \times 13 cm., ix + 214 p., 40 fig. Univ. of Chicago Press, Chicago, Illinois. July, 1918.

1472. CROZIER, W. J. Assortive mating in a nudibranch *Chromodoris zebra* Hellprin. Jour. Exp. Zool. 27: 247-292. 23 fig. Nov. 20, 1918.—Large individuals mate chiefly with other large ones, small with small. Cause of assortive mating appears to be mechanical. Number of eggs laid at one time is proportional to size of body. Since sperm injected by small individual might not suffice to fertilize all eggs of large one, assortive mating is adaptive, in that larger numbers of fertilized eggs are thereby produced.—A. F. Skull.

1473. DAVIS, B. M. Some inter- and back-crosses of F_1 *Oenothera* hybrids. Genetics 2: 155-185. 6 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 28. Jan., 1918.

1474. DAVIS, BRADLEY MOORE. The segregation of *Oenothera brevistylis* from crosses with *Oenothera Lamarckiana*. Genetics 3: 501-533. 7 fig. Nov., 1918.

1475. DETLEFSEN, J. A. Fluctuations of sampling in a Mendelian population. Genetics 3: 599-607. Nov., 1918.

1476. DE VRIES, HUGO. Kreuzungen von *Oenothera Lamarckiana* mut. *velutina*. [Crosses of *Oenothera Lamarckiana* mut. *velutina*.] Zeitschr. indukt. Abstamm. Vererb. 19: 1-38. Mar., 1918.—See Bot. Absts. 2, Entry 933.

1477. DE VRIES, HUGO. Twin hybrids of *Oenothera Hookeri* T. and G. Genetics 3: 397-421. Sept., 1918.

1478. DE VRIES, HUGO. *Oenothera rubrinervis*, a half mutant. Bot. Gaz. 67: 1-26. Jan. 1919.—See Bot. Absts. 2, Entry 398.

1479. DUERDEN, J. E. Absence of xenia in ostrich eggs. Jour. Heredity 9: 243-245. Oct., 1918.—Reviewing literature, it is well attested that seeds obtained from a cross-pollinated plant frequently show influence of the fertilizing pollen, but evidence of xenia in

poultry is not well authenticated. Recent work by author shows that eggs of North African ostrich, when fertilized by sperms of South African ostrich, a distinct species with eggs strikingly contrasting in size and proportions, and number and extent of pores, and the reciprocal, indicate no evidence of xenia. F_1 ostriches from these crosses reveal intermediate characters in all respects, except that the bald head patch occurring in the northern and absent in the southern is dominant. Eggs of F_1 birds are like those of southern ostrich in size and shape, but pittings are intermediate in number and depth.—*R. K. Nabours*.

1480. DURST, C. E. Tomato selection for *Fusarium* resistance. *Phytopath.* 8: 80. 1918. [See Bot. Absts. 1: Entry 93.]

1481. EBSTEIN, DR. ERICH. Zur Polydaktylie in einen südarabischen Herrscherge-schlecht. [On polydactyly in a south Arabian family of rulers.] *Die Naturwiss.* 4: 603-604. 1915.—Rev. by Hermann W. Siemens in *Zeitschr. induct. Abstamm. Vererb.* 19: 207-208. June, 1918.

1482. EMBODY, G. C. Artificial hybrids between pike and pickerel. *Jour. Heredity* 9: 253-256. *Fig. 4-5.* Oct., 1918.—See Bot. Absts. 2, Entry 25.

1483. FEDERLEY, HARRY. Die Vererbung des Raupendimorphismus von *Chaerocampa elpenor* L. [Inheritance of pupal dimorphism in *Chaerocampa elpenor* L.] *Öfversigt af Finska Vetenskaps- Soc. Förhandlingar* 58: 13. 1915-16.—Rev. by F. Lenz in *Zeitschr. induct. Abstamm. Vererb.* 19: 215-216. June, 1918.

1484. FOLSOM, DONALD. The influence of certain environmental conditions, especially water supply, upon form and structure in *Ranunculus*. *Physiol. Res.* 2: 209-276. *24 fig.* Dec., 1918.—Individuals of two plastic species, *Ranunculus sceleratus* and *R. abortivus*, were grown with different degrees of water supply. All plants were descended from single individual of each species. Direct relation found in first generation between water supply and many structural features, largely disappeared in second generation grown under somewhat different conditions. Ratio of leaf area under amphibious and xerophytic conditions was in one case (second generation of *R. sceleratus*) 17.8 : 2.7. A small third generation of this species to test for heritability of water effects on laminara rea revealed no transmission of such effects. [See Bot. Absts. 2, Entry 1484.]—*J. P. Kelly*.

1485. GERNERT, W. B. Aphis immunity of teosinte-corn hybrids. *Science* 46: 390-392. 1917.—Abst. in *Exp. Sta. Rec.* 38: 561. June 14, 1918.

1486. GOLDSCHMIDT, R. Experimental intersexuality and the sex problem. *Amer. Nat.* 50: 705-718. *3 fig.* 1916.—Abst. in *Exp. Sta. Rec.* 38: 65. Jan., 1918.

1487. GOLDSCHMIDT, R. On a case of facultative parthenogenesis in the gipsy moth (*Lymantria dispar*), with a discussion of the relation of parthenogenesis to sex. *Biol. Bull. Woods Hole* 32: 35-43. 1917.—Abst. in *Exp. Sta. Rec.* 38: 261. April 22, 1918.

1488. GOODALE, H. D. Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl. *Jour. Agric. Res.* 12: 547-574. 1918.—Abst. in *Exp. Sta. Rec.* 38: 876. Aug. 9, 1918.

1489. GOODSPEED, T. H., AND R. E. CLAUSEN. An apparatus for flower measurement. *Univ. California Publ. Bot.* 5: 435-437. *Pl. 54, fig. 1.* 1918.

1490. GREEN, S. N., AND J. G. HUMBERT. Disease-resistant varieties of tomatoes. *Monthly Bull. Ohio Agric. Exp. Sta.* 3: 43-48. *3 fig.* 1918.—Characteristics which tend to immunity are believed to be cumulative and usually repeated selections are necessary to

secure immunity to high degree. Resistance and immunity most frequently found in commercially unimportant strains or varieties.—Ohio work started in 1911 by selection of tomatoes for resistance to *Fusarium* wilt. Determination of possible resistance was made with seedlings, by sowing in infected soil. Subsequent field tests of strains showing resistance in seed bed gave only one strain that was completely resistant, but its yield was no greater than non-resistant commercial strains, and it was late in maturing. One strain gave an immunity of 87 per cent and was quite satisfactory with respect to earliness and yield. It will be made basis for further work. [Abst. in Exp. Sta. Rec. 38: 843. Aug. 9, 1918.]—C. E. Myers.

1491. HAECKER, V. Die entwicklungsgeschichtliche Vererbungsregel in der Völkerkunde. [The developmental law of inheritance in anthropology.] Zeitschr. induct. Abstamm. Vererb. 19: 73-78. Mar., 1918.

1492. HAGEDOORN, A. C., AND A. L. HAGEDOORN. Rats and evolution. Amer. Nat. 51: 385-418. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 185. June, 1918.

1493. HAGEDOORN-LA BRAND, A. C., AND A. L. HAGEDOORN. Parthenogenesis in higher plants. Teysmannia 27: 643-656. 1 pl., 1917.—Abst. in Exp. Sta. Rec. 38: 331. Mar., 1918.

1494. HALSTED, B. D. Colors in vegetable fruits. Jour. Heredity 9: 18-23. 1918.—Abst. in Exp. Sta. Rec. 38: 443. April, 1918. [See Bot. Abst. 1, Entry 25.]

1495. HALSTED, B. D. Reciprocal breeding in tomatoes. Jour. Heredity 9: 169-173. 1918.—Abst. in Exp. Sta. Rec. 39: 140. Aug., 1918. [See Bot. Absts. 1, Entry 26.]

1496. HALSTED, B. D. Weight of seeds as related to their number and position in the pod. Torreya 17: 102-103. 1917.—Abst. in Exp. Sta. Rec. 38: 535-536. June 14, 1918.

1497. HANSEN, ALBERT A. Petalization in the Japanese quince. Jour. Heredity 9: 15-17. 2 fig. Jan., 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Entry 27.]

1498. HARPER, R. A. Organization, reproduction and inheritance in *Pediastrum*. Proc. Amer. Phil. Soc. 57: 375-439. Pl. 5-6, fig. 35. 1918.—See Bot. Absts. 2, Entries 27, 60.

1499. HARRIS, J. A. On the distribution of abnormalities in the inflorescence of *Spiraea Vanhouttei*. Amer. Jour. Bot. 4: 624-636. 2 pl. 1917.—Abst. in Exp. Sta. Rec. 39: 30. July, 1918.

1500. HARRIS, J. A., A. F. BLAKESLEE, AND W. F. KIRKPATRICK. Inter-periodic correlation in the egg production of the domestic fowl. Proc. National Acad. Sci. U. S. Amer. 3: 565-569. 2 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 171-172. Feb., 1918.

1501. HAVAS, G. A hereféléken és más növényeken előforduló azonos rendellenességekről. [On similar cases of teratology in species of clover and in other plants.] Botanikai Közlemények 1917: 20-23. 1917.—German abst. in Zeitschr. Pflanzenzüchtung 6: 50-51. Mar., 1918.

1502. HAYES, H. K. Inheritance of a mosaic pericarp pattern color in maize. Genetics 2: 261-281. 1 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 332. Mar., 1918.—Also in *ibid.* 38: 531-532. June 14, 1918.

1503. HAYES, H. K. Natural crossing in wheat. Jour. Heredity 9: 326-330, 334. fig. 14-15. Nov., 1918.—Indications of natural crossing in wheat were observed by author in 1916 and 1917 in nursery wheat plots at University Farm, Minnesota Agricultural Experiment Station

and conclusion was then drawn that natural crossing in wheat was more common in the Northwest than had formerly been supposed or that seasons of 1915, 1916 were very favorable for cross pollination. Results now reported are similar to those obtained before and show that in 1917 there was also considerable natural crossing. In Durum and Emmer no crossing was observed but number of plants grown was relatively small (120 altogether). Observed crosses in *Triticum vulgare* lines averaged 1.3 per cent and as cross pollination doubtless occurred as often between plants of same variety as between different sorts conclusion is reached that natural crossing in 1917 was at least 2 to 3 per cent.—C. A. Gallastegui

1504. HAYES, H. K., AND A. C. ARMY. Experiments in field technique in rod row tests. Jour. Agric. Res. 11: 399-419. 1917.—Abst. in Exp. Sta. Rec. 38: 429-430. April, 1918.

1505. HAYES, H. K., AND D. F. JONES. The effects of cross- and self-fertilization in tomatoes. Connecticut State Agric. Exp. Sta. Rept. 1916: 305-318. 2 pl. 1916.—Abst. in Exp. Sta. Rec. 38: 241-242. April 22, 1918.

1506. HAYES, H. K., AND D. F. JONES. First generation crosses in cucumbers. Connecticut State Agric. Exp. Sta. Rept. 1916: 319-322. 1 pl. 1916.—Abst. in Exp. Sta. Rec. 38: 241. April 22, 1918.

1507. HECTOR, G. P. Observations on the inheritance of anthocyan pigment in paddy varieties. Mem. Dept. Agric. India, Bot. Ser. 8: 89-101. 2 pl. 1916.—Abst. in Exp. Sta. Rec. 38: 29. Jan., 1918.

1508. HERTWIG, PAULA. Keimesschädigung durch physikalische und chemische Eingriffe. [Injury of the germcells by physical and chemical means.] Zeitschr. induct. Abstamm. Vererb. 19: 79-88. Mar., 1918.

1509. HODGSON, ROBERT W. An interesting bud-sport in the Washington navel orange. Jour. Heredity 9: 301-303. 2 fig. Nov., 1918.—See Bot. Absts. 2, Entry 31.

1510. HOLDEN, H. S., AND DOROTHY BEXON. Observation on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of *Cheiranthus Cheiri*. Ann. Bot. 32: 513-530. 17 fig. Oct., 1918.—See Bot. Absts. 1, Entry 1330; 2, Entry 32.

1511. HOLMES, S. J., AND C. M. DOUD. The approaching extinction of the Mayflower descendants. Jour. Heredity 9: 296-300, 335. Nov., 1918.—See Bot. Absts. 2, Entry 414.

1512. HORSFELD, F. H. Longevity in Lily pollen. Jour. Heredity 9: 90. Feb., 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Entry 32.]

1513. HUMBERT, E. P. Inheritance of oil in cotton. Science 45: 411. 1917.—Abst. in Exp. Sta. Rec. 38: 533. June 14, 1918.

1514. ISSERLIS, L. On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables. Biometrika 12: 134-139. Nov., 1918.

1515. ISSERLIS, L. Formulae for determining the mean values of products of deviation of mixed moment coefficients in two to eight variables in samples taken from a limited population. Biometrika 12: 183-184. Nov., 1918.—See Bot. Absts. 2, Entry 418.

1516. JELINEK, J. Beitrag zur Technik der Weizenbastardierung. [Contribution to the technique of wheat crossing.] Zeitschr. Pflanzenzüchtung 6: 55-57. Mar., 1918.

1517. JENNINGS, H. S. The numerical results of diverse systems of breeding, with respect to two pairs of characters, linked or independent, with special relation to the effects of linkage. Genetics 2: 97-154. 1917.—Abst. in Exp. Sta. Rec. 38: 268-269. April 22, 1918.

1518. JENNINGS, H. S. Observed changes in hereditary characters in relation to evolution. Jour. Washington Acad. Sci., 7: 281-301. May, 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 37. Mar., 1918.

1519. JONES, D. F. The effects of inbreeding and crossbreeding upon development. Connecticut Agric. Exp. Sta. Bull. 207. 100 p., 12 pl. New Haven, 1918.—See Bot. Absts. 2, Entry 34.

1520. KEMPTON, J. H. A correlation between endosperm color and albinism in maize. Jour. Washington Acad. Sci. 7: 146-149. 1917.—Abst. in Exp. Sta. Rec. 38: 28-29. Jan., 1918.

1521. KEMPTON, J. H. The ancestry of maize. Jour. Washington Acad. Sci. 9: 3-11. Jan. 4, 1919.—See Bot. Absts. 2, Entry 35.

1522. KIESSLING, L. Über eine Mutation in einer reinen Linie von *Hordeum distichum* L. Zeitschr. indukt. Abstamm. Vererb. 19: 145-159. June, 1918.

1523. KING, H. G. Fasciated vegetable marrow. Gard. Chron. 64: 147. fig. 57. Oct. 12, 1918.—One branch of vegetable marrow vine growing on manure heap was fasciated, attaining width of five inches. Four fruits developed from eight pistillate flowers which appeared at node. Heredity of form has not yet been tested.—John Bushnell.

1524. KÜSTER, E. Über Anthocyanzeichnung und Zellenmutation. [On anthocyan pattern and cell mutation]. Ber. Deutsch. Bot. Ges. 33: 536-537. 1915.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220-221. June, 1918.

1525. KÜSTER, E. Die Verteilung des Anthocyans bei *Coleus*-Spielarten. [The distribution of anthocyan in *Coleus* varieties.] Flora 10: 1-33. 1917.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220-221. June, 1918.

1526. LA MARCA, F. Un nouvel hybride de greffe. [A new graft hybrid.] Compt. Rend. Paris 166: 647-649. 1918.—Abst. by F. F. Blackman in Physiol. Absts. 3: 293. July-Aug., 1918. Also by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 318. Sept., 1918. [See Bot. Absts. 1, Entry 911.]

1527. LANCEFIELD, D. E. Scarlet, an autosomal eye color identical with sex-linked vermilion. Biol. Bull. 35: 207-210. Oct., 1918.—Scarlet is a new mutant eye color in *Drosophila melanogaster*, in third chromosome approximately 3 units to left of dichaete. Scarlet is closely similar to old mutant, vermilion, which is sex-linked. Data of Richards [See Bot. Absts. 1, Entry 1287.] and Lancefield taken together put gene for scarlet 3.5 to left of dichaete. Appearing simultaneously with scarlet was another mutant eye color similar to pink. Its gene is in second chromosome and has double effect, producing also a bubble appearance in wings. This stock when pure, had low viability and died out before its gene could be definitely located.—C. B. Bridges.

1528. LÉCAILLON, A. Sur les caractères spéciaux que présentent, aux différents stades de leur développement, les Bivoltins accidentels qui se produisent chez le Bombyx du Mûrier. [On the special characters presented at different stages of development and the accidental bivoltins produced by them in the silkworm (*Bombyx*).] Compt. Rend. 165: 683-685. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 48. Mar., 1918.

1529. LIPPINCOTT, W. A. A fowl's breeding value. Country Gent. 82: 10-11. 8 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 775. June, 1918.

1530. LIPPINCOTT, WILLIAM A. The case of the blue Andalusian. Amer. Nat. 52: 95-115. Feb.-Mar., 1918.—Abst. by J. Arthur Thomson. Jour. Roy. Microsc. Soc. 1918: 300. Sept., 1918. [See Bot. Absts. 1, Entry 36.]

1531. LUNDBERG, J. F., AND Å. ÅKERMAN. Observations on the color of seeds originating from spontaneous crossing between two forms of *Phaseolus vulgaris*. Bol. Agric. [Sao Paulo] 18: 712-726, 793-807, 928-947. 1917.—Abst. Exp. Sta. Rec. 38: 539. June 14, 1918.

1532. MCARTHUR, CLIFFORD L. Transmissibility of immunity from mother to offspring in hog cholera. Jour. Infect. Dis. 24: 45-50. Jan., 1919.—See Bot. Absts. 2, Entry 686.

1533. MAC BRIDE, E. W., AND MISS A. JACKSON. The inheritance of colour in the stick-insect. Proc. Roy. Soc. 89: 109-118. 1915.—Rev. by Tine Tammes in Zeitschr. induct. Abstamm. Vererb. 19: 215. June, 1918.

1534. MACDOWELL, EDWIN CARLETON. Bristle inheritance in *Drosophila*. II. Selection. Jour. Exp. Zool. 23: 109-146. 10 fig. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 53. Mar., 1918.

1535. MCFADDEN, E. A. Wheat-rye hybrids. Jour. Heredity 8: 335-336. 1 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 735. June, 1918.

1536. MACOUN, W. T. Apple breeding in Canada. Agric. Gaz. Canada 5: 126-128. 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918.

1537. MIYAZAWA, B. Oomugi no mi no iro no iden ni tuite. [On the inheritance of the fruit-color of barley.] Bot. Mag. Tôkyô, 32: 308-310. Oct., 1918.—In a paper in Bot. Mag., Tôkyô, 30: 359-369 (Nov., 1916) and 31: 27-35 (Feb., 1917), entitled "[On the mosaic segregation of barley hybrids]" (in German and Japanese) author described segregation of black and white grains in F_1 hybrids of the two barley races, "Sekitori" and "Golden melon," and explained the peculiar segregation on basis of vegetative segregation. He has now found, however, that his former observations were wrong in certain respects. He describes results of his new experiments and concludes that there is no vegetative segregation and that all his results are simply explainable on basis of xenia.—*S. Ikeno*.

1538. MOLYNEUX, E. Fasciation not inherent. Gard. Chron. 64: 210. Nov. 23, 1918.

1539. MOORE, C. W. Self-sterility. Jour. Heredity 8: 203-207. 3 fig., 1917.—Abst. in Exp. Sta. Rec. 38: 426. April, 1918.

1540. MULLER, H. J. Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors. Genetics 3: 422-499. 1 fig. Sept., 1918.

1541. NAFZIGER, T. E. How sorghum crosses are made. Jour. Heredity 9: 321-322. Nov., 1918.—See Bot. Absts. 2, Entry 39.

1542. NEWMAN, H. H. Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids. Jour. Exp. Zool. 26: 391-421. Pl. 2. Aug., 1918. [See Bot. Absts. 1, Entry 490.]—Abst. by W. D. Halliburton in Physiol. Absts. 3: 457-458. Nov.-Dec. 1918.

1543. NICE, L. B. Further observations on the effects of alcohol on white mice. Amer. Nat. 51: 596-607. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 42. Mar., 1918.

1544. PEARL, R. The selection problem. Amer. Nat. 51: 65-91. 1917.—Abst. Exp. Sta. Rec. 38: 64. Jan., 1918.

1545. PEARL, R. Factors influencing the sex ratio in the domestic fowl. Science 46: 220. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1546. PEARL, R. Studies on inbreeding. VII. Some further considerations regarding the measurement and numerical expression of degrees of kinship. *Amer. Nat.* 51: 545-559. 1 fig. 1917.—Abst. in *Exp. Sta. Rec.* 38: 65. Jan., 1918. Also in *Jour. Roy. Microsc. Soc.* 1918: 44. Mar., 1918.

1547. PEARL, R. Studies on inbreeding. VIII. A single numerical measure of the total amount of inbreeding. *Amer. Nat.* 51: 636-639. 1 fig. 1917.—Abst. in *Exp. Sta. Rec.* 38: 269. April 22, 1918.

1548. PEARL, RAYMOND. The sex-ratio in domestic fowl. *Proc. Amer. Phil. Soc.* 56: 416-436. 3 fig. 1917.—Abst. in *Jour. Roy. Microsc. Soc.* 1918: 182. June, 1918.

1549. PHILIPS, A. G. Satisfactory method of pedigreeing fowls. *Reliable Poultry Jour.* 24: 1107-1108, 1174-1176. 5 fig. 1918.—Abst. in *Exp. Sta. Rec.* 38: 577. June 14, 1918. [See *Bot. Absts.* 2, Entry 40.]

1550. PINNEY, EDITH. A study of the relation of the behavior of the chromatin to development and heredity in teleost hybrids. *Jour. Morphol.* 31: 225-291. 14 pl., 88 fig. Sept., 1918. —In cross between *Fundulus* ♀ and *Ctenolabrus* ♂ many abnormal mitoses occurred, taking form of exaggerated lagging of chromosomes which probably eliminated whole chromosomes from nucleus. Development to advanced stage was common, but only one individual reached stage of hatching. All embryos possessed maternal characteristics, none paternal. In reciprocal cross early mitotic behavior was prevaillingly normal, but development ceased during gastrulation.—In *Ctenolabrus* ♀ × *Stenotomus* ♂ early mitotic figures were normal, but a number of vacuoles were in cytoplasm of egg. In large number of eggs of this experiment development proceeded to time of hatching, but none was hatched. Embryos were of maternal type. In reciprocal cross abnormal mitoses predominated, development ceased during gastrulation.—In *Ctenolabrus* ♂ × *Menidia* ♀ abnormal mitoses were frequent. Two embryos hatched. These were of maternal type. In reciprocal early mitoses were normal. Embryos reached advanced stage of development.—Cytological examination showed that egg of *Ctenolabrus* is better adapted to cooperate in mitosis with foreign sperm than eggs of other species used. Cleavage rhythm in hybrids is function of egg. Normal mitoses may occur in crosses in which development does not proceed far. Factor determining character of mitosis is quality of cytoplasm, not peculiarity of yolk of egg. Behavior of chromatin of spermatozoon during segmentation is independent of degree of relation existing between species crossed. With favorable cytoplasmic environment and compatible germ plasmas success in development may be expected, but favorable cytoplasmic environment is not enough to bring about this result if germ plasmas are not harmonious.—Cause of abnormal chromosome behavior is suggested as real cause of irregular development. In crosses in which nuclear behavior is abnormal greatest success in development occurs in more distantly related species, while in cases where mitotic behavior is normal converse is true. If cytoplasm of egg succeeds in entirely suppressing influence of spermatozoon, normal embryos of maternal type are obtained. There is yet no proof that nuclei of hybrid embryos of maternal type contain unchanged full number of maternal and paternal chromosomes. Appearance of paternal chromatophores indicates retention of paternal chromosomes. Apparent anomalies of first hybrids depend firstly upon effect of cytoplasm on sperm, secondly, reaction between two germ nuclei, and thirdly, variable specificity of effect of cytoplasm toward foreign spermatozoon.—Mary T. Harman.

1551. POPENOE, PAUL. Will morality disappear? *Jour. Heredity* 9: 269-270. Oct., 1918.

1552. PRIDHAM, J. T. Proportion of grain to sheaf as a factor in wheat selection. *Agric. Gaz. New South Wales* 28: 91-94. 1917.—Abst. in *Exp. Sta. Rec.* 38: 342. Mar., 1918.

1553. RAUNKIAER, C. Über die verhältnismässige Anzahl männlicher und weiblicher Individuen bei *Rumex thyrsiflorus* Fingerh. *Kgl. Danske Videnskabernes Selskab. Biol. Meddel.* 1: 3-17. 1913.

1554. RAUNKIAER, C. Om Løvsspringstiden hos Afkommet af Bøge med forskellig Løv-springstid. [On leaftime in the descendants of beeches with different leaf times.] Bot Tidsskr. 36: 197-203. 1918.—See Bot. Absts. 2, Entry 42.

1555. RAUNKIAER, C. Über den Begriff der Elementarart im Lichte der modernen Erblch-keitsforschung. [On the concept of elementary species in the light of modern genetical investigations.] Zeitschr. induct. Abstamm. Vererb. 19: 225-240. 2 fig. 1918.—See Bot. Absts. 2, Entry 41.

1556. RIDDLE, O. The theory of sex as stated in terms of results of studies on the pigeon. Anat. Rec. 11: 510. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1557. RIETZ, H. L., AND L. H. SMITH. A statistical study of some indirect effects of cer-tain selections in breeding Indian corn. Jour. Agric. Research 11: 105-146. 24 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 232-233. April 22, 1918.

1558. RITCHIE-SCOTT, A. The correlation coefficient of a polychoric table. Biometrika 12: 93-133. Nov., 1918.—See Bot. Absts. 2, Entry 700.

1559. ROBBINS, R. B. Some applications of mathematics to breeding problems. Genetics 2: 489-504. 1917.—Abst. Exp. Sta. Rec. 38: 367. Mar., 1918.

1560. ROBBINS, RAINARD B. Some applications of mathematics to breeding problems. III. Genetics 3: 375-389. July, 1918.—General mathematical discussion of expectations in Mendelian population after n generations of breeding according to system indicated, when two linked character differences are involved. Systems of breeding considered include (a) random mating, (b) selection of dominants with respect to one of the linked characters, and (c) self-fertilization. To make formulae apply to independent characters, make linkage $r=1$.

1561. ROBBINS, RAINARD B. Random mating with the exception of sister by brother mat-ing. Genetics 3: 390-396. July, 1918.—Mathematical discussion of results of this particular type of breeding in case of monohybrid combination when character involved is independent of sex. Concludes that when brother and sister mating is omitted, progeny in succeeding generations approach fixed proportion of pure dominants, heterozygotes and recessives, as number of generations increases. When only two offspring are in typical family, limiting proportion has larger proportion of heterozygotes than in case of completely random mating, but if typical family contains more than two offspring, proportions of three types in limiting family are same as in random mating.

1562. ROEMER, TH. Über die Befruchtungsverhältnisse verschiedener Formen des Gar-tenkohles (*Brassica oleracea* L.). [On the fertilization relationship of different forms of garden cabbage (*Brassica oleracea* L.)]. Zeitschr. Pflanzenzüchtung 4: 125-141. 1918. Rev. by Richard Freudenberg in Zeitschr. induct. Abstamm. Vererb. 19: 222-223. June, 1918.

1563. SAUNDERS, EDITH R. Studies in the inheritance of doubleness in flowers. II. *Meconopsis*, *Althaea*, and *Dianthus*. Jour. Genetics 6: 165-184. 1917.—Abst. Exp. Sta. Rec. 39: 123. Aug., 1918.

1564. SAX, KARL. The inheritance of doubleness in *Chelidonium majus* Linn. Genetics 3: 300-307. May, 1918.—Investigations on inheritance of doubleness in flowers of other plants briefly reviewed. Reciprocal crosses between a double and single-flowered "wild" plant gave in each case in F_2 approximately 1:1 ratio. In F_2 , seed of F_1 singles gave 109 singles: 24 doubles, while seed of F_1 doubles gave in F_2 , 6 singles: 105 doubles. Assuming the 6 F_2 singles from F_1 doubles to be contaminations, results indicate inheritance of doubleness in *Chelidonium* is due to one factor pair with doubleness recessive. Much variation in num-ber of floral parts of double segregates, though no greater than in double ancestors. Nega-tive correlation between petal and stamen number in F_2 is high, due to petalody.—O. E. White.

1565. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. *Citrus-fruit improvement: a study of bud variation in the Washington navel orange.* U. S. Dept. Agric. Bull. 623. 15 × 23 cm., 146 p., 19 pl., 16 fig. 1918.

1566. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. *Citrus fruit improvement: a study of bud variation in the Marsh grapefruit.* U. S. Dept. Agric. Bull. 697. 112 p., pl. 1-2, 14 fig. 1918.

1567. SILVER, ALLEN. Two interesting hybrids. *Avic. Mag.* 10: 12-14. Nov., 1918.—Seven hybrids between Lesser Redpoll and Twite were bred; only one was reared. Characters of its parents are almost equally merged in it. Also reports and describes three hybrids between ♂ Goldfinch and ♀ Twite.—*L. J. Cole.*

1568. SÔ, M., AND Y. IMAI. On the xenia of the barley. *Bot. Mag., Tôkyô*, 32: 205-214. Oct., 1918.—Authors made some experiments on hybridization of barley similar to those of Miyazawa (see Bot. Absts. 1, Entry 1537), and found that segregation in F₁ generation is explainable on basis of xenia, the results of their experiments being thus in perfect accordance with those newly obtained by Miyazawa.—*S. Ikeno.*

1569. STOMPS, TH. J. Über die verschiedenen Zustände der Pangene. [On the different states of the pangenes.] *Biol. Zentralbl.* 1917: 161-177. 1917.—German Abst. in *Zeitschr. Pflanzenzüchtung* 6: 53. Mar., 1918.

1570. STOUT, A. B. Fertility in *Cichorium intybus*: The sporadic occurrence of self-fertile plants among the progeny of self-sterile plants. *Amer. Jour. Bot.* 4: 375-395. 2 fig. 1917.—Abst. in *Exp. Sta. Rec.* 38: 226. April 22, 1918.

1571. STOUT, A. B. Experimental studies of self-incompatibilities in fertilization. *Proc. Soc. Exp. Biol. and Med.*, 15: 51-54. 1918.—Abst. by W. S[tilles] in *Physiol. Absts.* 3: 299. July-Aug., 1918. [See Bot. Absts. 1, Entry 939.]

1572. TENOPYR, LILIAN A. On the constancy of cell shape in leaves of varying shape. *Bull. Torrey Bot. Club* 45: 51-76. 1918.—[See Bot. Absts. 1, Entries 72, 997.]—On basis of measurements for length-width ratios of leaf cells in *Campanula rotundifolia*, *Lobelia erinus*, two species of *Linum* and common type of *Cichorium intybus*, it is concluded that average cell size for given tissue for any species or variety is a fairly constant and hereditary character. Witloof variety of chicory had larger cells than type. Differences in shapes of leaves on same plant are independent of cell shapes and author states that they are "obviously due to heredity," and that hereditary size of organ is due to factors of periodicity regulating number and direction of cell divisions. [Abst. in *Jour. Roy. Microsc. Soc.* 1918: 316-317. Sept., 1918.]—*James P. Kelly.*

1573. TILDESLEY, M. L. Preliminary note on the association of steadiness and rapidity of hand with artistic capacity. *Biometrika* 12: 170-177. Nov., 1918.

1574. TRABUT, L. The hybrid origin of alfalfa. *Compt. Rend. Acad. Sci. [Paris]* 164: 607-609. 1917.—Abst. in *Exp. Sta. Rec.* 38: 332. Mar., 1918.

1575. VAN DER LEK, H. A. A. Biological or physiological races of plant parasites and their economic significance. *Tijdschr. Plantenziekten* 23: 85-98, 137-164. 1 fig. 1917.—Abst. in *Exp. Sta. Rec.* 39: 148. Aug., 1918.

1576. VAN SOMEREN, V. G. L. Melanism in *Whydahs*. *Avic. Mag.* 10: 40-41. Dec., 1918.

1577. VOGTHER, KARL. Über die theoretischen Grundlagen des Variabilitäts- und Descendenzproblems. [On the theoretical foundations of the variability and descent problems.] Zeitschr. induct. Abstamm. Vererb. 19: 39-72. Mar., 1918.

1578. WARREN, DON C. Mutations in *Drosophila Busckii* COQ. Amer. Nat. 51: 699-703, 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 192. June, 1918.

1579. WENTWORTH, E. N., AND J. B. SWEET. Inheritance of fertility in Southdown sheep. Amer. Nat. 51: 662-682. 1917.—Abst. in Exp. Sta. Rec. 38: 574-575. June 14, 1918.—Also in Jour. Roy. Microsc. Soc. 1918: 179. June, 1918.

1580. WHITING, P. W. Inheritance of coat-color in cats. Jour. Exp. Zool. 25: 539-569. April, 1918. Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 294-295. Sept., 1918.—[See Bot. Absts. 1, Entry 52.]

1581. WHITNEY, D. D. The relative influence of food and oxygen in controlling sex in rotifers. Jour. Exp. Zool. 24: 101-138. 4 fig., 4 diagrams. 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 310. Sept., 1918.

1582. WILLIAMS, C. B. Some problems of sex ratios and parthenogenesis. Jour. Genetics 6: 255-267. 5 fig. 1917.—Abst. in Exp. Sta. Rec. 38: 458-459. April, 1918.

1583. WOODS, FREDERICK ADAMS. Will not morality necessarily improve? Jour. Heredity 9: 331-332. Nov., 1918.—See Bot. Absts. 2, Entry 270.

1584. ZIMMER, JOHN T. Inherited feeding habit of herons. Jour. Heredity 9: 271. Oct., 1918.—Author observed that captive young herons were unable to pick up pieces of fish from the floor without several trials, but were unerring when the pieces were placed in a shallow basin of water. This was undoubtedly due to light refraction, since in nature they secure most of their food in shallow water. These herons were unable to profit by experience. Author believes this habit of facility in picking up food from shallow water rather than from the ground is inherited trait.—R. K. Nabours.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

THALLOPHYTES

1585. SAUVAGEAU, C. Sur les plantules d'une Laminaria a prothalle parasite (*Phyllaria reniformis* Rostaf.). [Young plants of a parasitic Laminaria.] Compt. Rend. Paris 165: 787-789. 1918.—Author gives a brief account of very young stages of *Phyllaria reniformis* found growing on a coralline alga (*Lithophyllum lichenoides*) at Banyuls-sur-Mer. He finds the plantlets springing from a vertical filament of several thin-walled cells wholly imbedded in the calcareous *Lithophyllum*, and, by similarity and analogy with what he has observed in actual cultures of other Laminariaceae, he interprets this imbedded and apparently parasitic filament as a sexual prothallus with an oogonium at its outer or free end, this oogonium persisting as the basal cell of the *Phyllaria* plantlet (sporophyte). Whether this unusual mode of existence in a calcareous alga has become a necessary adaptation for the prothallus of *Phyllaria reniformis*; whether it involves apogamy, and how the first penetration of its stone-like host is made, are questions yet to be answered.—M. A. Howe.

1586. WOLFE, J. J. Alternation of generations in *Padina*. Jour. Elisha Mitchell Soc. 34: 78-109. 1918.—In *Padina variegata*, abundant at Beaufort, N. C., the sperms, eggs and

tetraspores are borne upon three separate plants. Tetraspores produce male and female plants in approximately equal numbers, and fertilized eggs produce tetrasporic plants, so that there is an antithetic alternation of generations. Eggs also germinate without fertilization, but the parthenogenetic plants die before reaching reproductive stage.—*Charles J. Chamberlain*.—[See Bot. Absts. 1, Entry 983.]

1587. MURPHY, P. A. The morphology and cytology of the sexual organs of *Phytophthora erythroseptica*. *Ann. Bot.* 32: 115-153. 2 pl. 1918.—Abst. in *Exp. Sta. Rec.* 39: 431. 1918. [See Bot. Absts. 1, Entry 573.]

SPERMATOPHYTES

1588. BAILEY, L. W., AND W. P. THOMPSON. Additional notes upon the angiosperms *Tetracentron*, *Trochodendron* and *Drimys*, in which vessels are absent from the wood. *Ann. Bot.* 32: 503-512. 1 pl., 9 fig. 1918.—Authors discuss character of tracheidal tissue in secondary wood of these 3 genera, and in particular the status of certain scalariform vessel-like structures in wood of *Drimys*, described by Jeffrey and Cole in their criticism of authors' earlier paper on this subject. Term "vessel" is defined, and it is shown that structures in question cannot be regarded as true vessels. Evidence is brought forward that they are not segments of vestigial vessels but are typical tracheids having transitional types of pitting. Such cells occur not only as result of wounding, but normally in stem and root of all 3 genera studied. It is concluded that true vessels do not occur in these genera, and that there is no evidence to show that vessels once did occur in the group and have since been lost. Development of scalariform pitting and other features in structure of wood are discussed and attention is called to similarity of secondary wood of *Tetracentron* and *Trochodendron* to that of certain *Pteridophyta* and older *gymnosperms*. [See Bot. Absts. 1, Entry 1602.]

1589. DAVIE, R. C. A comparative list of fern pinna-traces, with some notes on the leaf-trace in the ferns. *Ann. Bot.* 32: 233-245. 1918.—Earlier papers of author on anatomy of fern leaves are here supplemented by a list of 220 species, gathered from a wide range of genera. These species may be classified according to whether pinna supply is of "extra-marginal" or "marginal" type. These types are about evenly divided among the various genera. The grouping of genera so provided accords well with generic boundaries recognized by taxonomists. Conclusion is drawn that adaxial portion of pinna trace is portion dependent on heredity, while abaxial portion is variable in relation to features of individual leaf.—*M. A. Chrysler*.

1590. HOAR, CARL S. The anatomy and phylogenetic position of the *Betulaceae*. *Amer. Jour. Bot.* 3: 415-435. Pl. 16-19. 1916.—Anatomical evidence, chiefly ray structures, leads author to conclude that *Betulaceae* belong near the base of the dicotyledons. *Casuarina* is closely related anatomically to *Amentiferae* and is also regarded as a primitive dicotyledon. [Through rev. by J. M. Coulter, in *Bot. Gaz.* 65: 198-199. 1918.]

1591. HODGSON, R. W. An account of the mode of foliar abscission in *Citrus*. *Univ. California Publ. Bot.* 6: 417-428. 1918.—Abst. by T. H. Goodspeed in *Bot. Gaz.* 66: 75-76. 1918. [See Bot. Absts. 1, Entries 67, 191.]

1592. HOLMES, M. G. A study in the anatomy of hazel-wood with reference to conductivity of water. *Ann. Bot.* 32: 553-567. 10 fig. 1918.—Paper aims to find an anatomical basis for variation in conducting power of wood for water. A statistical method of investigating the constitution of wood from this standpoint is presented, the number, size and distribution of conducting elements of wood being portrayed in graphical form. Stool shoots of hazel were investigated and considerable variation noted in the constitution of wood of first year's growth. In passing from base to apex of shoot, a decrease in total amount of conducting tissue is recorded, and an increase in relative amount of conducting tissue per unit of area of wood.—[See Bot. Absts. 2, Entry 192.]

1593. JENSEN, G. H. Studies on the morphology of wheat. Washington Agric. Exp. Sta. Bull. 150: 3-31. 5 pl., 75 fig. 1918.—Author has investigated morphology of reproductive structures in wheat, using 4 varieties,—Bluestem, Marquis, Hybrid and Little Club. No important morphological differences were observed between these, except that primordia of spike are produced near surface of ground in spring varieties and below it in winter varieties. Nothing out of the ordinary was observed in development of microspore and male gametophyte, megaspore and female gametophyte, fertilization and early development of embryo and endosperm. Author describes and figures a thin-walled papilla in wall of young microspore, where spore touches tapetum, and suggests that this is the point through which absorption of food material by spore takes place. [Abst. by J. M. Coulter in Bot. Gaz. 66: 288. 1918. Also in Exp. Sta. Rec. 39: 341-342. 1918.]

1594. McCLUNG, C. E. Some considerations regarding microscopical technique. Anat. Record 14: 265-282. 1918.—Micotechnique is a tool as yet imperfectly developed and merits all the attention we can give. Necessity for immediate fixation should be borne in mind. For this purpose it is better to fix in picro-formal at 38°C. in order to secure rapid penetration, and in Fleming's at 0°C. in order to keep tissue unchanged until fixed. Addition of urea, various sugars and malic acids aids in fixation, especially nuclear sap. With Flemming's fixed material short washing gives good mitochondria and poor nuclei, long washing gives the reverse effect. Shrinkage occurs in dehydration, clearing, and infiltration. Therefore great care is essential.—Farr.

1595. NOYES, H. A., J. F. TROST, AND L. YODER. Root variations induced by carbon dioxide gas additions to soil. Bot. Gaz. 66: 364-373. 9 fig. 1918.—*Capsicum annuum abbreviatum*, *Lactuca sativa*, *Raphanus sativus* and *Phaseolus vulgaris* were studied. In all cases considerable alteration in shape of root system was induced by treatment of soil with carbon dioxide. Tops were affected much less than roots.—[See Bot. Absts. 1, Entry 1661.]

1596. RUBY, J. Biological and morphological investigations on the olive and on its varieties cultivated in France. Ann. Sci. Nat. Bot. 9: 1-286. 86 fig. 1917.—A "general botanical study" of the olive, including considerable morphological information. [Through abst. in Exp. Sta. Rec. 39: 243. 1918.]

1597. STANFORD, ERNEST E., AND ARNO VIEHOVER. Chemistry and histology of the glands of the cotton plant, with notes on the occurrence of similar glands in related plants. Jour. Agric. Res. 13: 419-436. Pl. 42-50. 1918.—Authors describe occurrence of internal lysigenous glands in primary cortex, secondary cortex, foliage, flower and seed of *Gossypium hirsutum*. Glands in secondary cortex are simpler than the rest and often arise from a single cell. Glands are surrounded by envelope of flattened cells, the contents of which differ chemically according as the plant parts bearing them are normally exposed to light or not. Internal glands of this type are universally present in *Gossypium* and occur to some extent in the related genera *Thespesia*, *Cienfugosia*, *Erioxylon* and *Ingenhouzia*. Glands which function as nectaries are also described. These are morphologically distinct from the internal glands. A detailed study is made of chemistry of secretions of the internal glands.

1598. CHAMBERLAIN, CHARLES J. Foreign pollen in *Cycas*. Bot. Gaz. 66: 392. 1918. [Rev. of: Le Goc., M. J. Effect of foreign pollination on *Cycas Rumphii*. Ann. Roy. Bot. Gard. Peradeniya 6: 187-194. Pl. 18. 1917.]—In this species ovules reach full size after pollination by *Encephalartos* or *Macrozamia*, but no fertilization takes place and mature seeds show no embryo. Reviewer has previously noted a probably similar situation in *Strangeria*.

1599. CHAMBERLAIN, CHARLES J. The embryo sac of *Aster* and *Solidago*. Bot. Gaz. 65: 571-572. 1918. [Review of: Palm, B. Zur embryologie der gattungen *Aster* und *Solidago*. Acta Horti Bergiani 5: 1-18. 27 fig. 1914.]—Author believes extensive development in anti-

podal region is due to growth of lower megaspores of tetrad, thus disagreeing with previous conclusions of reviewer and Miss Opperman. Reviewer holds author's evidence inconclusive and still maintains that cells in question are antipodals.

1600. PALM, BJ., AND A. A. L. RUTGERS. The embryology of *Aucuba japonica*. Recueil Trav. Bot. Néerland. 14: 119-126. 12 fig. 1917.—Authors show that apogamy almost certainly does not occur in this species. [Through rev. by J. M. Coulter in Bot. Gaz. 66: 79. 1918.]

1601. PFEIFFER, NORMA E. The sporangia of *Thismia americana*. Bot. Gaz. 66: 354-363. Pl. 16. 1918.—Further study of this north temperate zone representative of the Burmanniaceae demonstrates its similarity to most members of the family, in contrast to the apogamous *Burmannia coelostictis*. There is usual development of microsporangia, though with marked abortion of sporogenous cells. Of the 4 megaspores produced, 2 outermost lie side by side and, with third, soon degenerate. Innermost megaspore produces a typical angiosperm embryo-sac, in which fertilization probably takes place and gives rise to a well developed embryo (for Burmanniaceae), imbedded in large-celled endosperm. A striking nucellar cap of tissue is a feature of seed.—N. E. Pfeiffer.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

1602. BAILEY, I. W., AND W. P. THOMPSON. Additional notes upon the angiosperms *Tetracentron*, *Trochodendron* and *Drimys*, in which vessels are absent in the wood. Ann. Bot. 32: 503-512. 9 fig., pl. 16. Oct. 1918.—In this continuation of previous studies the authors give evidence to prove that the scalariform tracheary elements, which have been described in traumatic root tissue, of *Drimys colorata*, are not vessel-like structures but are typical tracheids with transitional types of pitting such as occur in various Arthrophyta, Cycadophyta, Pteridospermophyta and Angiospermophyta. The interpretation that regards these elements in *Drimys* as traumatic recapitulation in a conservative organ is negated by their occurrence in uninjured stems and roots of *Tetracentron*, *Trochodendron* and *Drimys*. The authors state that there is no structural evidence which might be considered to indicate that these vesselless angiosperms are a reduction series from ancestors with true vessels in their secondary wood, and they conclude that these genera have retained this primitive type of vesselless wood structure, in which respect they resemble some of the calamites, seed ferns and cycadeoids, namely the more primitive gymnospermous phylae, and contrasting in their anatomy with the Coniferophyta. [See Bot. Absts. 1, Entry 1588.]

1603. CHANEY, RALPH W. The ecological significance of the Eagle Creek flora of the Columbia River Gorge. Jour. Geol. 26: 577-592. 4 fig. 1918.—The Eagle Creek formation comprises from 500 to 2700 feet of prevailingly pyroclastic rocks exposed in the gorge of the Columbia River. Fossil plants have been collected from 18 localities representing about 80 species. The author discusses their ecologic significance and considers that he has representatives of both xerophytic and mesophytic types, which he interprets as upland oak forests and valley forests of maple, elm, sweet gum, etc. The former physiography is considered to have been of the bajada type and the climate to have been somewhat warmer and drier than prevails at the present time in the region. Because of its relations to the upper Clarno flora of Oregon the Eagle Creek formation is considered to be of upper Eocene age.

1604. CLEMENTS, F. E. Scope and significance of paleo-ecology. Bull. Geol. Soc. Amer. 29: 369-374. 1918.—A formulation of principles and a plea for the greater emphasis of the ecological aspects of paleontology as interpreted by the ecological results derived from studies of the existing biota.

1605. KRYSHTOFOVICH, A. Occurrence of the palm, *Sabal nipponica*, n. sp., in the Tertiary rocks of Hokkaidō and Kyūshū. Jour. Geol. Soc. Tokyo, 25: 59-66. Dec., 1918.—The presence of a large leafed fan palm in the early Tertiary of Japan in 43° N. Lat., about 8° north of the existing range of palms in that region adds to the problem of the botanist when he attempts an explanation of the almost worldwide distribution of such highly organized monocotyledons as the palms in the Upper Cretaceous and early Tertiary. The present new species, *Sabal nipponica*, is associated with species of *Lastraea*, *Acrostichum*, *Dicksonia*, *Taxodium*, *Populus*, *Zelkova*, *Carpinus*, *Nelumbium*, *Alnus*, *Platanus*, etc., indicating a probable contemporaneity with the Kenai coal-bearing series of Alaska, and adds another to the long list of facts which indicate the great poleward extension of mild climatic conditions in the early Tertiary.

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

1606. ARTHUR, J. C. An outline of the history of Phytopathology. Science 48: 651-652. 1918.—[Review of Whetzel, Herbert Hice. An outline of the history of Phytopathology.]—"This orderly presentation of the evolution of a science destined to play an increasingly wider and more important part in the affairs of human well-being and achievement is particularly timely. Professor Whetzel has compressed into the hundred and thirty pages of his book a well balanced and helpful outline of the historical aspects of the science. It is a valuable addition to botanical literature."—[See Bot. Abst. 1, Entry 377.]

1607. BRIERLEY, WILLIAM B. The microconidia of *Botrytis cinerea*. Bull. Misc. Inf. Kew 1918: 129-146. 1 pl. 1918.—Morphology and physiology.

1608. BUTLER, E. J. Immunity and disease in plants. Agric. Jour. India (Special Indian Science Congress Number). P. 10-32. 1918.—General discussion of susceptibility and resistance based on Indian and other literature.—L. R. Hesler.

1609. CAMPREDON D'ALBARETTO, E. [Simple solutions of copper sulfate against vine mildew.] Ann. R. Acad. Agric. Torino 40: 13-19. 1918.—2.5 per cent solution of copper sulfate in 5 per cent dextrin is an effective therapeutic. It is to be used in preference to bordeaux only in emergencies. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 898-899. 1918.]

1610. CASTELLA, F. DE, AND C. C. BRITTLEBANK. [Notes on downy mildew of the vine in Australia.] Jour. Dept. Agric. Victoria 15: 685-700. Fig. 1-2. 1917.—Record of an epiphytotic in 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 396. 1918. Abst. in Exp. Sta. Rec. 39: 357. 1918.]

1611. CAYLEY, DOROTHY M. *Pseudomonas seminum* n. sp., a bacterium injurious to peas in England. Jour. Agric. Sci. 8: 461-479. Pl. 4-7. 1917.—[Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 633-634. 1918.]

1612. COTTON, A. D. Diseases of parsnips. Bull. Misc. Inf. Kew 1918: 8-21. 2 pl., 2 fig. 1918.—"Canker"—A more or less open wound, at first reddish brown in color, which occurs on shoulder or upper part of root, frequently ending in destruction of entire root. Lesions originate in horizontal growth cracks and are augmented by soil fungi, bacteria and animals. Suberization of exposed tissue occurs but no wound-cork develops as in carrots, etc. Cultural practices are thought to account largely for cracking, but use of lime or of salt seems to have reduced it.—Descriptions and synonymy of the following organisms with very brief notes on their destructiveness: *Erysiphe polygoni*, *Phyllachora pastinacae* (with a revised and corrected description), *Ramularia pastinacae*, *Cercospora pastinacea*, *Plasmopara nivea*. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 899-900. 1918.]

1613. C[OTTON], A. D. [Activities of the] Pathological laboratory. Bull. Misc. Inf. Kew 1918: 39-42. 1918.—Brief report of diseases prevalent in England in 1917 with special mention of black-currant rust (*Cronaratum ribicola*) and of onion diseases caused by *Botrytis*, *Peronospora* and *Sclerotinia*.—Notes on research in connection with *Sphaerotheca mors-uvae*, *Podosphaera ceuotricha* and *Botrytis cinerea*.—Work on wart diseases [of potato] was mostly without result but "the absolute immunity of certain varieties is a piece of sheer good fortune which has saved the country from a very grave situation."

1614. EDSON, H. A. The importance of disease control to the grower of certified potato seed. Bull. Wisconsin Potato Growers' Assoc. 3: 21-22. 1918.

1615. FINLOW, R. S. Rhizoctonia in jute: the inhibiting effect of potash manuring. Agric. Jour. India (Special Indian Science Number). P. 65-72. 1918.—Jute (*Corchorus* sp.) is attacked by *Rhizoctonia solani* particularly when grown on laterite red soils. Analyses show such soils to be very deficient in calcium and phosphorus but total per cent of potash is .3. Use of lime on such soil increases yields enormously but does not affect presence of Rhizoctonia. Use of potash (hyacinth ash) gave increased yields (100 per cent better than checks or plots treated with carbonate of soda). Rhizoctonia was rampant throughout the non-potash plots which always contained about ten times as many diseased plants as the potash plots.

1616. GILLESPIE, L. J. The growth of the potato-scab microörganism at various hydrogen-ion concentrations as related to the occurrence of potato scab. [Abstract.] Abstr. Bact. 2: 1. 1918. [See Bot. Absts. 1, Entry 309.]

1617. GILLESPIE, LOUIS J., AND LEWIS A. HURST. Hydrogen-ion concentration—Soil type—Common potato scab. Soil Science 6: 219-236. 1918.—Authors' summary contains the following: "Examination of a large number of soils from northern Maine showed an excellent correlation between hydrogen-ion concentration and occurrence of common potato scab. Soils having a hydrogen-ion exponent as low as 5.2 rarely produced scabby potatoes, soils having exponents much higher generally did produce scabby potatoes. Similar results were found for a few soils of different origin and type. The limiting zone of hydrogen-ion exponent for the potato scab organism appears to be about the same for the soil as had previously been found for culture media.—The characteristic difference of hydrogen-ion exponent between the Caribou and the Washburn loams has been confirmed. The typical Caribou loam has a hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam is generally hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam is generally less intensely acid (shows larger exponents) and potatoes grown on it are usually scabby.—A considerable number of soils having the exponent 5 are successfully cultivated in potatoes and truck crops without liming, showing that the exponent 7 (which indicates physico-chemical neutrality) can hardly be taken in general as "the rational" end-point in lime-requirement tests. No such standard end-point is suggested, this being left for future determination with specific crops." [See Bot. Absts. 1, Entry 309; 2, Entry 849.]

1618. GRAVES, ARTHUR HARMOUNT. Resistance in the American chestnut to the bark disease. Science 48: 652-653. 1918.—In vicinity of New York City no trees of *Castanea dentata* were found immune to attack of *Endothia parasitica* but a considerable number of resistant trees were found. Evidence of resistance is based on slow increase of lesion upon inoculation; occurrence of trees in a region long since devastated by the disease; the long period the disease had been present in the trees themselves; extensive development of callus tissue, etc.; grouping of the trees in well defined areas, pointing to a genetic variation; manifestation of resistance by all parts—coppice, twigs, branches, etc.—indicating an inherent conditions.

1619. HEMMI, T. [Japanese.] [On the gloeosporiose of Caladium.] Sapporo Nat. Hist. Soc. 7: 41-70. 1918.—Pathological, morphological and cultural studies on *Gloeosporium*

aracearum found on the living leaves of *Caladium* in hot house of Sapporo Agricultural College. Growth on synthetic media compared with that of allied fungi and their strains isolated from many different plants. It grows well on comparatively strong acid media and liquifies gelatin; maximum temperature 37-38°C, optimum 27-28°C. and minimum 6-7°C.—S. Hori.

1620. HILLIARD, C. M., AND MILDRED A. DAVIS. The germicidal action of freezing temperatures upon bacteria. Jour. Bact. 3: 423-431. 1918.—*B. coli* used but conclusions of interest in connection with over-wintering.—“Intermittent freezing exerts a more effective germicidal action than continuous freezing.—The degree of cold below freezing is not very important in the destruction of bacteria. There is no critical temperature below freezing where germicidal effect is greatly accelerated.—Death-rate is much higher in media frozen solid than in same media not solid and at a slightly lower temperature.”—Crystallization, probably resulting in mechanical crushing is an important germicidal factor at freezing point.

1621. HORI, S. [Japanese.] [Third report on banana disease in Bonin islands.] Engei no Tomo [The Horticulturist's Friend] 14: Nos. 9-11. 1918.—Since 1899, by the increased facilities of communication, banana culture in Bonin islands has offered the most profitable industry to the islanders; in 1912, it had attained the magnitude of about 350 acres and was increasing. At the end of 1912, however, banana plants in some parts of the islands suddenly showed an abnormal growth, were dwarfed (2-3 ft.), with small yellowish green leaves. The disease spread with rapidity, all the banana plants of the islands were destroyed during 1913-1915 and sugar cane culture took the place. The author has made voyages several times since 1915 to investigate the cause of the disease and to perform field experiments. It became clear that the disease is not caused by the attack of nematodes, fungi or bacteria, but it is of a purely non-parasitic nature, caused by the deficiency of potash in the soil and the manure of common usage. In the field manure experiment, the plants on those plots where no potash or excessive nitrogen was applied, dwarfed 67-100 per cent, while on the plot manured with an ample quantity of potash by potassium sulphate or wood ashes only 12 per cent. Above all, on the plot to which was applied stable manure with potash the plants attained the best growth with no sign of the disease. In the therapeutic experiment, both diseased plants on the spot and diseases shoots transplanted, mostly recovered by the application of the manure above mentioned.—S. Hori.

1622. HOWITT, J. E., AND D. H. JONES. The more important fungus and bacterial diseases of vegetables in Ontario. Ontario Agric. Col. Bull. 258: 1-48. *illustr.* 1918.—[Abst. in Internat. Rev. Sci. Pract. Agric. 9: 771. 1918.]

1623. HUTSON, J. C. Notes on certain plant bugs connected with cotton in St. Vincent. West Indian Bull. 17: 27-39. 1918.—Biological studies and methods of control of insects instrumental in transmitting the fungi of internal boll disease.

1624. JOHNSON, A. G., AND R. E. VAUGHAN. Ergot in rye and how to remove it. Wisconsin Agric. Exp. Sta. Ext. Circ. 94: 1-4. 1918.—A salt brine is prepared of sufficient concentration to float the ergot sclerotia and shriveled kernels which may then be skimmed off. It is necessary to wash the grain after treating to prevent seed injury.—James G. Dickson.

1625. JONES, L. R., A. G. JOHNSON, AND C. S. REDDY. Bacterial blight of barley. Jour. Agric. Res. 11: 625-643. Pl. 4, fig. 2. 1917.—*Bacterium translucens* n. sp. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 631-632. 1918.]

1626. KELLER, G. N. [Tobacco growing in Ireland (The experiments in 1916).] Jour. Dept. Agric. Tech. Instr. Ireland 17: 461-466. 1917.—Varieties “Broad leaf burley” and “Irish gold” very susceptible to root rot (*Thielavia basicola*). [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 64. 1918.]

1627. LIND, J. Kunstgödnng som Middel mod Plantesygdomme. [Artificial fertilization as a means of controlling plant diseases.] 36 p. Kopenhagen, 1917.—A discussion of the possibilities of altering the susceptibility of plants to diseases by the use of artificial fertilizers. [Through abstr. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 35-37. 1918.]—W. H. Rankin.

1628. LÜSTNER, G. Feinde und Krankheiten der Gemüsepflanzen. Ein Wegweiser für ihre Erkennung und Bekämpfung. [Insect enemies and diseases of vegetables. A guide for their determination and control.] Bearbeitet im Auftrage des Herrn Ministers für Landwirtschaft, Domänen u. Forsten. 72 p. 43 fig. Stuttgart, 1917. [Abstr. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 37. 1918.]

1629. MOLZ, E. [The selection of plants resistant to diseases, animal pests and adverse meteorological conditions. Zeitschr. Pflanzenz. 5: 121-244. 1917.—Compilation. [Through abstr. in Internat. Rev. Sci. Pract. Agric. 9: 554-558. 1918.]

1630. NISHIKADO, Y. Studies on the rice blast fungus. I. Ber. Ohara Inst. landwirtschaft. Forsch. 1: 171-218. Pl. 3-4. 1918.—Report of work on the strains of *Piricularia* isolated from rice, crab-grass, Italian millet, green foxtail, *Zingiber mioga*, and *Z. officinale* of Japan. By infection and cultural experiments and morphological comparisons, it is proved that: *P. oryzae* causes the blast of rice plant; *P. grisea* is parasitic on crab-grass; *P. setariae* sp. nov. occurs on *Zingiber mioga* and *Z. officinale*. These species of *Piricularia* cannot infect healthy plants other than their respective hosts. *P. oryzae* does not grow in carbon dioxid. In dry conditions, the spores maintain their vitality from the autumn to the next summer, hence spores may be a source of early infection.—S. Hori.

1631. NISHIKADO, Y., AND C. MIYAKE. [Japanese.] [Disinfection of rice grain for the control of the brown spot disease.] Byo-chu-gai Zasshi [Jour. Plant Protec.] 5^o: 1-20. 1918.—Investigation of hot water treatment of rice seed to prevent brown spot disease caused by *Helminthosporium oryzae*. Since the disease may appear even from seed sown on thoroughly disinfected sand, spore- or mycelium-bearing seed must account for at least 50 per cent of origin of the disease. Spores are killed in 10 minutes in hot water, 51°C., while air dry seed is not injured by treatment 10-15 minutes in 54-55°C. Practically, to prevent the disease, rice seed should be treated at seeding time for 10 minutes at 52°C. or 5 minutes at 54°C. after soaking 24 hours in water of room temperature.—S. Hori.

1632. NOWELL, WM. Internal disease of cotton bolls in the West Indies. II. West Indian Bull. 17: 1-26. 1918.—Green bug (*Nezara viridula*), leaf-footed bug (*Leptoglossus batteatus*), and cotton stainers (*Dysdercus* spp.), puncture cotton bolls injuring the young seeds; this in turn stops the development of lint and causes the shedding or drying up of bolls. Pea chink (*Edessa meditabunda*) causes little direct injury and does not transmit the internal boll disease.—The 4 fungi of internal boll disease were found in the seeds of 20 species of plants in 7 orders and 15 genera.—Injury to cotton bolls is caused principally by one fungus in one locality and by another in a different locality.—Punctures of the green bug bring about infection with the fungi of internal boll disease only when the bugs are transferred from diseased plants.

1633. NOWELL, WM. Diseases of economic plants. [Part II of Report on the prevalence of some pests and diseases in the West Indies during 1917.] West Indian Bull. 17: 96-102. 1918.—Brief notes on occurrence, distribution and prevalence of various diseases of sugarcane, cotton, cacao, lime and other citrus trees, bananas and plantains, maize, coco-nut, onions, pigeon peas, nutmegs, and insects.—Notes on phanerogamic parasites.

1634. PEGLION, V. [Monilia sp., the cause of a specific gummosis of the apricot tree, in Italy.] Rend. R. Accad. Lincei, Cl. Sci. fis. mat. e nat. V, 26: 637-641. 1917.—*Sclerotinia cinerea* or *S. laxa*. "The most significant character is the absolute restriction of parasitism to the apricot tree." [Through abstr. in Internat. Rev. Sci. Pract. Agric. 9: 635-636. 1918.]

1635. PETCH, T. Black rot disease of tea. Ceylon Dept. Agric. L'f't. 2. 3 p. fig. 2. 1917.—Chief characteristics of disease are persistence of hanging dead leaves and occurrence of dead leaves united in clusters. The fungus- *Hypochnus* sp., occurs also on *Calophyllum burmanni* and *Hemidesmus indicus*.—Record of successful inoculations. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 119-120. 1918.]
1636. PETRI, L. [Blepharosporea cambivora n. gen. and n. sp., a cause of ink disease in chestnut trees.] Rend. R. Accad. Lincei, (Cl. Sci. fis. mat. e nat.) V, 26: 297-299. 1917.—Fungus is near the Pythiaceae.—Record of successful inoculations. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 397. 1918.]
1637. SALMON, E. S. On forms of the hop (*Humulus lupulus* L.) resistant to mildew (*Sphaerotheca humuli* (D. C.) Burr.) Jour. Agric. Sci. 8: 455-460. 1917.—Ten seedlings mostly of Italian origin have been found practically immune to the "biologic form" occurring on hops. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 251-252. 1918.]
1638. SAVASTANO, L. [Treatment of *Fusicladium pirinum* var. *Eriobotryae*, injurious to the Japanese medlar tree.] R. Staz. Sper. Agrum. e Frut. Acireale Bull. 29: 1-6. 2 fig. 1917.—Secured control by dormant (?) treatment with strong lime-sulfur solution. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 636-637. 1918.]
1639. SAVASTANO, L. [The control of a disease of the Japanese medlar caused by *Fusicladium pirinum* var. *eribotryae*.] R. Staz. Agrum. e Frut. Acireale, Bull. 33: 1-2. 1918.—When the disease is present on branches spray in August with lime-sulfur solution 10-12 per cent, normal density 1.25. The same solution should be used about January 1, i.e., when the disease begins to appear, and February 1. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 901. 1918.]
1640. SCHENK, P. J. Tegen een drietal rozenvijanden. [Against a triad of rose enemies.] Rosarium 25: 49-52. 1915.—A method of control for mildew which also controls two insects of the rose.—Spray with 2.5 per cent "California mixture," 1 per cent salicylic acid in 1 per cent alcohol with addition of 2 per cent green soap. [Through abst. by O. Von Kirchner in Zeitschr. Pflanzenkr. 28: 41-42. 1918.]—W. H. Rankin.
1641. SCHRIBAUX. Resistance du manitoba aux maladies cryptogamiques. Compt. Rend. Acad. Agric. France 4: 530-532. 1918.—Wheat variety, Manitoba, especially resistant to smut (bunt) and perhaps to rust.
1642. SHEAR, C. L. Endrot of cranberries. Jour. Agric. Res. 11: 35-42. 1917.—A soft rot of berries of *Oxycoccus macrocarpus* caused by *Fusicoccum putrefaciens*. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 254. 1918.]
1643. STEVENS, F. L. Mycology and plant pathology. Plant World 21: 53-54. 1918. [Rev. of: Harshberger, John W. A text-book of mycology and plant pathology.]
1644. TORREND, C. [Insect and vegetable parasites of the cacao tree in the State of Bahia, Brazil.] Broteria, Ser. Bot., 15: 106-127. 4 pl. 1 fig. 1917. Also *ibid.*, Ser. vulgar zação Sci. 15: 263-279. 4 fig. 1917.—*Phytophthora faberi* causes fruit rot and *Corticium lilacinofuscum* is epiphytic on green branches. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 523-524. 1918.]
1645. TURNER, W. F. *Nezara viridula* and kernel spot of pecan. Science 47: 490-491. 1918. [See Bot. Absts. 1, Entry 374.]—Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 1000-1001. 1918.
1646. VAUGHAN, R. E. Progress in control of plant diseases. Ann. Rept. Wisconsin State Hort. Soc. 48: 179-186. 1918.

1647. VAUGHAN, R. E., AND A. G. JOHNSON. Fight grain smuts and blights. Wisconsin Agr. Exp. Sta. Ext. Circ. 57: 1-4. 1916. Revised, Mar., 1918.—Barley should be soaked two hours in a solution of one pint formaldehyde (40 per cent) in 30 gallons water. Oats, wheat and rye should be soaked five minutes in 1 pint in 30 gallons water, drained and covered for two hours. The grain should be spread out to dry after treatment. Treatment with the smut machine is satisfactory for oats, wheat, and rye.—James G. Dickson.

1648. WEIR, JAMES R. Experimental investigations on the genus *Razoumofskyia*. Bot. Gaz. 66: 1-31. Fig. 1-19. 1918.—Cross inoculations and cultural studies were made to determine the range of hosts of this group of mistletoes. *Razoumofskyia campylopoda* and *R. cryptopoda*, both occurring on yellow pines, are found to be distinct species. The former was found by inoculation to infect *Pinus resinosa*, *P. sylvestris* and *P. montana*. *Razoumofskyia laricis* Piper infects not only the American species of *Larix* but also *L. europea* and *L. leptolepis*. *Abies grandis*, *Pinus ponderosa*, and *P. contorta* were infected with difficulty, indicating that this species is primarily a larch parasite. *R. Douglasii abietina*, common on *Abies*, proved to be identical with *R. Douglasii*, common on *Pseudotsuga taxifolia*. Cross inoculations and field observations indicate that this species is of importance only on *Pseudotsuga taxifolia*. The lodgepole pine mistletoe, *R. americana* has as its true host *Pinus americana*, but will attack several other species of hard pines. The hosts of the hemlock mistletoe (*R. tseugensis*) are shown to be *Tsuga heterophylla*, *T. canadensis* and *Abies lasiocarpa*. The negative cultural tests of the different species are also given. The fact that several of these mistletoes readily infect exotic hosts indicates the importance of preventing the accidental importation of mistletoe seeds to the native homes of the hosts. [See Bot. Absts. 1, Entry 1377.]—H. W. Anderson.

PHYSIOLOGY

B. M. DUGGAR, Editor

[Unsigned abstracts are by the editor.]

PERMEABILITY AND DIFFUSION

1649. COLLINS, E. J. The structure of the integumentary system of the barley grain in relation to localized water absorption and semi-permeability. Ann. Bot. 32: 381-414. 9 fig. 1918.—The author gives the results of experiments to show that most of the water absorbed by the barley grain is taken up through the micropylar region rather than through the cuticularized cell-walls. In the micropylar region are special areas that permit the entry of water and here must be sought the apparatus for the remarkable selective permeability which prohibits the entry of mineral acids and most salts but passes water with comparative freedom. Solutes such as iodine and acetic acid barely pass at all through the general surface of the grain but, like water, enter by the restricted region at the micropylar end. Nitric acid, which also penetrates the micropylar end of the grain by selective action, neither destroys the enveloping membrane nor impairs the efficiency of the selective apparatus.

The barley grain does not possess perfect impermeability to any solute tested. After many days sulphuric acid gradually enters if the grains are kept in the solution. It was observed in this connection that the initial concentrating effect of barley upon dilute sulphuric acid is gradually reversed, the solution finally exhibiting a concentration lower than the initial.—Penetration of silver nitrate and of sodium chloride is checked by the outer cuticularized walls. This layer of cutin is permeable to water and solutes only to the extent usually associated with cuticle. If the grain covering is used as a membrane in an osmotic cell slow passage of water will take place for months toward a salt solution, but no salt passes in the reverse direction for a considerable time. The initial absorption of water supplies the need of the embryo; the inner layers in the seed coat form a well constructed system for conveying this water to that part of the grain where it can be accessible to the embryo. The subsequent distribution of liquid in the endosperm follows the paths of enzyme disintegration during germination. It is suggested that the water absorbed and distributed during germination takes up and carries with it the enzymes which digest the reserves.—S. M. Zeller.

1650. CROZIER, W. J. Cell penetration by acids. IV. Note on the penetration of phosphoric acid. Jour. Biol. Chem. 33: 463-470. 1918.—Following a line of work already considerably developed by Harvey, Crozier, and Haas, the author finds that the speed with which H_3PO_4 penetrates the tissues of *Chromodoris* is affected by density of the cells and by quantities of buffer materials present in the cells. A mathematical expression is developed for the curves obtained.

1651. THODAY, D. Some observations on the behavior of turgescient tissue in solutions of cane sugar and of certain toxic substances. New Phytol. 17: 57-68. 8 fig. 1918.—Imbibition by potato tissue in several solutions was determined by the change in weight. The results obtained with cane sugar are essentially the same as those obtained by Stiles and Jørgensen (Ann. Bot. 31: 425). Toxic substances, such as mercuric chloride, mercuric cyanide, osmic acid, chloroform, picric acid and phenol were observed. In M/100 mercuric chloride the initial swelling was greater than in distilled water and the same result obtained with osmic acid (M/100) may be compared with similar results obtained by Stiles and Jørgensen with sulphuric acid.—S. M. Zeller.

METABOLISM, ENZYMES, FERMENTATION

1652. BURNETT, T. C. Does the liver secrete a catalase accelerator? Proc. Soc. Exp. Biol. and Med. 15: 80. 1918.—Indications are furnished that variations in catalase activity in different organs may be due to the presence or absence of accelerators rather than to differences in the catalase content.

1653. EDSON, N. A. The effect of frost and decay upon the starch in potatoes. Jour. Indust. Chem. Engin. 10: 725-726. 1918.

1654. WATANABE, C. K., AND V. C. MYERS. A delicate method of determining invert activity. Proc. Soc. Exp. Biol. and Med. 15: 142-143. 1918.

DEVELOPMENT

1655. BIOLETTI, FREDERIC T., AND F. C. H. FLOSSFEDER. Topping and pinching vines. California Agric. Exp. Sta. Bull. 296: 371-384. 1918.—Experiments made with the Carignane and Tokay grape showed that topping or pinching the vines during the growing season is harmful. Some varieties growing on very rich soil and others whose fruit buds are mostly produced on the laterals might be benefited by moderate summer pruning. [See Bot. Absts. 1, Entry 734.]—F. F. Halma.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1656. PARR, ROSALIE. The response of *Pilobolus* to light. Ann. Bot. 32: 177-205. 1918.—The writer presents a review of the literature on theories of response which are referred to as invoking (1) intensity difference, (2) ray direction, (3) wave-length, (4) energy. The response of *Pilobolus* to carefully calibrated light of different wave-lengths and intensities was studied. *Pilobolus* responds to light of all regions of the visible spectrum. The presentation time gradually decreases from red to violet. There are no intermediate maxima and minima. The presentation time does not vary in direct ratio with the measured energy value, but in inverse ratio to the square root of the wave frequency. The product of the square root of the frequency and the presentation time diminishes with the decrease in the energy value of the spectral regions, and is an approximate constant for a given light source. The spectral energy in its relation to presentation time may be expressed approximately in the Weber-Fechner formula, if the wave frequencies be made a function of the constant. The relation of the spectral energy to the presentation time may also be approximately expressed by the Tröndle formula, the wave frequencies being made a function of the constant.—S. M. Zeller.

TEMPERATURE RELATIONS

1657. FREE, MONTAGUE. Effect of low temperatures on greenhouse plants. Brooklyn Bot. Gard. Record 8: 14-17. 1919.—General indications as to the conditions of the plants when, due to coal shortage, the temperature in the houses fell as low as 28-30°F.

1658. KIESSELBACH, T. A., AND J. A. RATCLIFF. Freezing injury of seed corn. Nebraska Agric. Exp. Sta. Bull. 163: 1-16. 1918.—The causes of freezing injury of seed corn are late maturity of the corn and abnormally early freezing weather. By selecting early maturing ears or planting seed of some earlier type the damage caused by late maturity can be overcome.—F. F. Halma.

TOXIC AGENTS

1659. BRENCHLEY, WINIFRED E. Organic plant poisons. II. Phenols. Ann. Bot. 32: 259-278. 18 fig. 1918.—The phenols suggest possibilities for the partial sterilization of soils. In experiments upon barley and pea plants grown in water cultures, M/100 concentrations of phenols were fatal. In weaker concentrations the toxic action varies considerably for different phenols. Concentrations below a certain limit do not retard plant growth. No signs of stimulation were observed.—S. M. Zeller.

1660. HALL, IVAN C., AND LILLIAN J. ELLEFSON. The elimination of spurious presumptive tests for *B. coli* in water by the use of gentian violet. Jour. Bact. 3: 329-354. 1918.—Gentian violet, 1 part in 20,000, and often even 1 part in 100,000, is found to be efficacious in eliminating from the lactose broth cultures many species of bacteria interfering with the usual "presumptive test" for the coli group. The selective inhibiting action was tested on a variety of Gram-positive anaerobes, a group most frequently interfering with the presumptive test, and in these cases it was highly satisfactory. The dye incidentally inhibits also the less important (because less frequently gas-forming) aerobes. Finally, it retards the growth of certain strongly proteolytic forms which, while not fermenting glucose, may nevertheless interfere with the test by producing sufficient alkali to preclude the development of the characteristic red colonies of *B. coli* when the individuals are relatively few.

1661. NOYES, H. A., J. F. TROST, AND L. YODER. Root variations induced by carbon dioxide gas additions to soil. Bot. Gaz. 66: 364-373. Fig. 1-9. 1918.—These experiments were planned primarily to determine the value of soil aeration, or rather the injurious action of carbon dioxide accumulation in the soil. The plants were grown in soil in Wagner pots and CO₂ was introduced subterraneously. The plants employed were *Capsicum annuum abbreviatum*, *Lactuca sativa*, *Raphanus sativus*, and *Phaseolus vulgaris*. All were found to be affected more or less by the addition of carbon dioxide, this action being marked upon the roots. Where 650 cc. of CO₂ was introduced per pot per hour, normal root development ceased. [See Bot. Absts. 1, Entry 1595.]

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

ALGAE

1662. NIEUWLAND, J. A. Critical notes on new and old genera of plants.—X. Amer. Midland Nat. 5: 50-52. 1917.—See Bot. Absts. 1, Entry 1421.

FUNGI

1663. ARTHUR, J. C. Uredinales of Guatemala based on collections by E. W. D. Holway, IV. Puccinia on Carduaceae, Form-Genera and Index. Amer. Jour. Bot. 5: 522-555. 1918.

—This is the fourth and concluding number of a series of articles with the above general title by the same author. The preceding parts were published in the same journal (Amer. Jour. Bot. 5: 325-336, 420-446, 462-489. 1918). In this series of papers 232 species of rusts distributed on 32 genera are recorded from Guatemala. In the present paper detailed citations of collections and critical notes are given with reference to 41 species of *Puccinia* on Carduaceae, 8 in the form-genus *Uredo*, one in *Peridermium*, and 5 in *Aecidium*. New species are described as follows: *Puccinia Hodgsoniana* on *Eupatorium* by F. D. Kern; *P. solidipes* and *P. basiporula* on *Eupatorium*, *P. ordinata* on *Calea*, *P. semota* on *Gymnolomia*, *P. cornuta* on *Notoptera*, *P. Schistocarphae* on *Schistocarpha*, *P. inaudita* on *Zezmenia*, *P. Coreopsidis* on *Coreopsis* by Jackson and Holway; *Uredo Triniochloae* and *U. Zeugitis* on Poaceae, *U. Fuchsiae* on Onagraceae, *U. Rondeletiae* on Rubiaceae, by Arthur and Holway. The author also describes *Aecidium seriatum* on Euphorbiaceae and transfers *Uredo Trixidis* Kern & Kellerm. to *Puccinia* and *Endophyllum singulare* Diet. & Holw. to *Aecidium*. An index to species and to host plants for the entire series is appended. [See Bot. Absts. 1, Entries 384, 385, 386.] —H. S. Jackson.

1664. COTTON, A. D. Diseases of parsnips. Bull. Misc. Inf. Kew. 1918: 8-21. 2 pl. 2 fig. 1918.—See Bot. Absts. 1, Entry 1612.

1665. FAIRMAN, CHARLES EDWARD. New or noteworthy Ascomycetes and lower fungi from New Mexico. Mycologia 10: 239-264. 1918.—The paper is based on collections made by Paul C. Standley (see Mycologia 10: 34). New species are described of the following genera: *Diatrype*, *Didymella* (2), *Apiosporella*, *Rhabdospora* (2), *Leptosphaeria* (2), *Gibberidia*, *Pyrenophora*, *Hendersonia* (5), *Microdiplodia* (3), *Phyllachora*, *Hysterium*, *Patellea*, *Phoma* (2), *Dothiorella*, *Placosphaeria*, *Coniothyrium*, *Ascochyta*, *Ascochyula*, *Stagonospora*, *Cryptostictis*, *Camarosporium* (2), and *Arthrobotryum*. New varieties are described in the following genera: *Eutypella*, *Leptosphaeria*, and *Coniothyrium* (2). *Teichospora cercocarpi* (Earle) appears as a new combination.—H. M. Fitzpatrick.

1666. GARDNER, M. W. Anthracnose of Cucurbita. U. S. Dept. Agric. Bull. 727. p. 168. 1918.—This paper contains a historical presentation of the synonymy of *Colletotrichum lagenarium* (Pass.) Ell. and Halst. [See Bot. Absts. 2, Entry 1037.]—H. M. Fitzpatrick.

1667. NEGER, F. W. Experimentelle Untersuchungen über Rusztaupilze. Flora 10: 67-139. Fig. 1-31. 1917.—The author describes as new *Gyroceras fumagineum* and *Tripodsporium pinophilum*. *Coniothecium crustaceum* (*Sarcinomyces crustaceus* Lindner) appears as a new combination, the genus *Sarcinomyces* Lindner being reduced to synonymy under *Coniothecium*. What have been considered as conidia in the latter genus the author states is the vegetative body, no mycelium being present, the mycelium formerly attributed to species of the genus being that of other intermingled fungi. The author, furthermore, describes for the species true conidia, which he regards as previously unrecorded. "Dematium II" and "Hormiscium II" are provisionally listed as new. Extensive notes, especially on characteristics in pure culture, are given for all the above forms as well as for *Dematium pullulans*, *Cladosporium herbarum*, *Atichia glomerulosa* Stein, *Fumago vagans* Pers., *F. foothii* Berk. & Dem., and one unidentified species each of *Torula*, *Helminthosporium*, and *Botryotrichum*.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, Editor

[Unsigned abstracts are by the editor.]

1668. DAVIDSON, ANSTRUTHER. *Lupinus mollisifolius* spec. nov. Bull. Southern California Acad. Sci. 17: 57. 1918.—A new species of lupine is described from southern California.

1669. DAVIDSON, ANSTRUTHER. *Lupinus Paynei* spec. nov. Bull. Southern California Acad. Sci. 17: 58-59. 1918.—The author describes a second shrubby species of lupine from southern California as new to science.

1670. DAVIDSON, ANSTRUTHER. Additions to the local flora. Bull. Southern California Acad. Sci. 17: 60-61. 1918.—Several additions to the local flora of southern California are placed on record.

1671. HAYATA, BUNZO. Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanum. Roy 8 vo. Vol. vii, p. 107, pl. I-IV, fig. 69. Taihoku, Mar. 25, 1918.—Approximately two hundred and seventy-five species and varieties, mostly flowering plants belonging to eighteen families, are treated in the present volume. The following species and varieties are described as new: *Stellaria reticulivena*, *Thea hozanensis*, *T. Nakaii*, *Rubus suishaensis*, *R. arisanensis* var. *horishaensis*, *R. Somai*, *R. linearifolius*, *Photinia daphniphyloides*, *Abelia ionandra*, *Galium Morii*, *G. tarokoense*, *Diospyros Sasakii*, *Euphorbia tarokoensis*, *Ficus bakauensis*, *F. ochobensis*, *F. tannoensis*, *Quercus spinosa* David var. *Miyabei*, *Q. tarokoensis*, *Juniperus formosana* Hay. var. *concolor*, *Podocarpus nankoensis*, *Liparis heitaoensis*, *Trillium Morii*, *Allium morrisonense*, *Paspalum akoensis*, *P. distichum* L. var. *anpinense*, *Isachne heterantha*, *I. arisanensis*, *Panicum pseudodistachyum*, *P. barbipedum*, *P. suishaense*, *Spodiopogon tohoensis*, *S. hogoensis*, *S. Takeoi*, *Pollinia geniculata*, *P. Fauriei*, *P. arisanensis*, *P. formosana*, *Pollinopsis Somai*, *Andropogon kwashotensis*, *Agrostis suizanensis*, *A. transmorrisonensis*, *A. sozanensis*, *A. morrisonensis*, *Muehlenbergia arisanensis*, *Calamagrostis formosana*, *C. morrisonensis*, *Brachypodium formosanum*, *Polystichum Morii*, *Selaginella kelungensis*, *S. subcaulescens*, *S. pseudo-involvens*, and *S. Somai*. One new genus is also proposed namely, *Polliniopsis* of the Gramineae. The total number of species of the Formosan flora, so far as known, is 3359, which is indicative of the relatively rich and varied flora of that country.

1672. HITCHCOCK, A. S., Generic types with special reference to the grasses of the United States. Amer. Jour. Bot. 5: 248-253. 1918.—The author discusses the subject of generic types, presents certain definitions and principals relative to the selection of type species, and illustrates by examples drawn from the grasses.

1673. LEECHMAN, ALLEYNE. The genus *Rhizophora* in British Guiana. Bull. Misc. Inf. Kew. 1918: 1-8. 1918.—The author recognizes three species of *Rhizophora* growing along the coast in the neighborhood of Georgetown, British Guiana. One of these, *R. Harrisonii*, is described as new to science.

1674. MAXON, WILLIAM R. A new *Anemia* from Mexico. Jour. Washington Acad. Sci. 8: 199-200. 1918.—*Anemia Makrinii* Maxon is described as a species new to science from the state of Oaxaca.

1675. MAXON, WILLIAM R. A new *Selaginella* from Oklahoma and Texas. Proc. Biol. Soc. Wash. 31: 171-172. Dec. 30, 1918.—*Selaginella Sheldoni* is described as a new species of the *S. rupestris* group.

1676. PEGLER, A. On the flora of Kentani. Ann. Bolus Herb. 2: 163-184. 1918.—In the present article the author continues the enumeration of the plants of Kentani, listing nearly 600 species and varieties of flowering plants, ferns, and lycopods.

1677. RICKER, P. L. A synopsis of the Chinese and Formosan species of *Albizzia*. Jour. Washington Acad. Sci. 8: 242-246. 1918.—The author records twelve species of *Albizzia* from China and Formosa. The following are either described as new or given new specific names: *Albizzia Meyeri*, *A. Henryi*, and *A. corniculata*.

1678. RICKER, P. L. A sketch of botanical activity in the District of Columbia and vicinity. Jour. Washington Acad. Sci. 8: 487-498. 516-521. 1918.—The author presents a historical account of floristic botany of the District of Columbia and vicinity and a compiled bibliography of the taxonomic literature dealing mainly with the flowering plants and ferns of the same region.

1679. SARGENT, C. S. Notes on North American trees. III. *Tilia*. II. Bot. Gaz. 66: 494-511. 1918.—In continuation of his treatment of the North American lindens the author recognizes and describes eight additional species and seven varieties, including the following which are characterized as new to science: *Tilia caroliniana* Miller var. *rhoophila*, *T. texana*, *T. texana* var. *grosseserrata*, *T. phanera*, *T. phanera* var. *scabrida*, *T. lasioclada*, *T. heterophylla* Ventenat var. *Michauxii*, *T. heterophylla* Ventenat var. *nivea*, *T. heterophylla* Ventenat var. *amphiloba*, *T. monticola*, *T. georgiana*, and *T. georgiana* var. *crinita*.

1680. STANDLEY, PAUL CARPENTER, Rubiales. Rubiaceae (pars). North Amer. Flora 32: 1-86. Dec. 28, 1918.—Three tribes of the Rubiaceae are elaborated in the present part namely, *Condamineeae* with eight genera and twenty-eight species, *Oldenlandieae* with six genera and fifty-three species, and *Rondeletieae* with six genera and one hundred and nineteen species. The following new combinations with the name-bearing synonym in parenthesis, and new species are included: *Chimarrhis ferruginea* (*Rustia ferruginea* Standley), *Portlandia Shaferi*, *P. albiflora* Britt. & Harris, *Isidorea cubensis*, *Clavenna tetrandra* (*Peplis tetrandra* L.), *Houstonia floridana*, *H. procumbens* (*Anonymos procumbens* Walt.), *Neomazaea Shaferi*, *Acrosynanthus parvifolius* Britton, *A. latifolius*, *A. lucidus* Britton, *A. trachyphyllus*, *Rondeletia Ehrenbergii* K. Schumann, *R. Langlassei*, *R. darienensis*, *R. aspera*, *R. Bourgaei*, *R. pansamalana*, *R. Galeottii*, *R. Deamii* (*Bouvardia Deamii* Donn. Smith), and *R. costaricensis*.

1681. SUKSDORF, WILHELM, *Cardamine oligosperma* and its near allies. Rhodora 20: 197-199. 1918.—This article includes two new combinations namely, *Cardamine lucens* (*C. oligosperma* var. *lucens* G. S. Torrey) and *C. bracteata* (*C. hirsuta* subsp. *oligosperma* var. *bracteata*. O. E. Schulz).